968898

Groundwater & Environmental Services, Inc.
1737 Georgetown Road, Unit E
Hudson, Ohio 44236
T. 877.505.9382

April 28, 2021

Mr. William Murray
EPA Project Manager/Coordinator
U.S. Environmental Protection Agency (USEPA), Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604

Addendum To Completion of Remedial Action Report
Himco Superfund Site
City of Elkhart, Elkhart County, Indiana 46516
CERCLA ID No. IND980500292

Dear Mr. Murray:

As requested by Bayer Healthcare LLC (Bayer), Groundwater & Environmental Services, Inc. (GES) has prepared the attached Addendum to the Completion of Remedial Action Report, dated 26, 2021 on behalf of Bayer for the Consent Decree (CD) for Remedial Design/Remedial Action (RD/RA) at the Himco Superfund Site in the City of Elkhart, Indiana (Site). This submittal provides documentation that Bayer has completed the Remedial Action requirements of Civil Action No. 2:07-cv-304-TS (dated November 28, 2007).

Per CD Section XIV (*Certification of Completion*), Bayer must submit a Completion of Remedial Action Report (CRAR) to notify and document to the United States Environmental Protection Agency (USEPA) and the State of Indiana Department of Environmental Management (IDEM) that the site RD/RA has been fully performed and the performance standards have been attained in accordance with CD requirements. The initial CRAR was completed by Conestoga-Rovers & Associates (CRA) and submitted to the USEPA and IDEM on August 31, 2012. USEPA approved the initial CRAR in a letter dated September 13, 2012. EPA also prepared a Preliminary Site Closeout Report, dated July 19, 2012, for the RD/RA work documented in the initial CRAR. Subsequent to that, additional Remedial Action activities were conducted and the purpose of the attached addendum is to document completion of those activities.

The CRAR Addendum documents the following:

- Summary of RD/RA work completed since the completion and approval of the 2012 CRAR.
- Major deliverables/submittals submitted to and approved by the USEPA Region 5 and IDEM in satisfying the CD conditions (including the 2012 CRAR).

As summarized in the CRAR Addendum, Bayer has completed all RD/RA work and submittals required by the 2004 Amended Record of Decision and CD. Based on this, Bayer requests that the USEPA provide Certification of Completion for the Remedial Action in accordance with Section XIV.b of the CD.

In addition to meeting the CD requirements for Remedial Action Certification, Bayer understands that this submittal will provide USEPA with the information needed to complete the Final Closeout Report (FCOR) and proceed with delisting of the Site from the National Priorities List.

Please feel free to contact Randy Cooper with Bayer at 314-439-6459, or me at 410-320-6456, with questions or comments concerning this submittal.

Sincerely,

GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

Joseph A. Keller
Vice President

cc: Randall Cooper, Bayer
Douglas Petroff, IDEM
Chintan Amin, Bayer
Jennifer Simon, Kazmarek Mowrey Cloud Laseter LLP
Mark Motylewski, GES

Attachment:

Completion of Remedial Action Report Addendum

HIMCO Site Trust

Completion of Remedial Action Report Addendum

HIMCO Landfill

Elkhart, Indiana

April 28, 2021

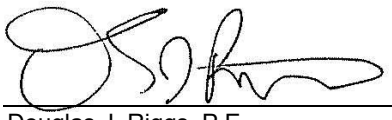
Completion of Remedial Action Report Addendum

HIMCO Landfill
Elkhart, Indiana

Prepared for:
HIMCO Site Trust
800 N. Lindbergh Blvd., R226
St. Louis, MO 63167

Prepared by:
Groundwater & Environmental Services, Inc.
1737 Georgetown Road, Unit E
Hudson, Ohio 44236
TEL: (877) 505-9382
www.gesonline.com

Date:
April 2021



Douglas J. Riggs, P.E.
Senior Engineer

Joseph A. Keller
Vice President

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Figures

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Appendices *

* GES has included text and figures only for many of the referenced reports in the interest of brevity and convenience of reviewing this report. Complete versions of these documents exist in the project files as originally submitted.

Acronyms

CCR/CRAR	Construction Completion Report / Completion of Remedial Action Report
CRA	Conestoga-Rovers & Associates
CRAR	Completion of Remedial Action Report
ERC	Environmental Restrictive Covenant
GES	Groundwater & Environmental Services, Inc.
GHD	Gutteridge, Haskins and Davey
GWSDAT	Groundwater Spatiotemporal Data Analysis Tool
IC	Institutional Control
IDEM	Indiana Department of Environmental Management
LTS	Long Term Stewardship
MAROS	Monitoring and Remediation Optimization System
NPL	National Priorities List
OSWER	Office of Solid Waste and Emergency Response
PCOR	Preliminary Closeout Report
PSD	Performing Settling Defendants
QAPP	Quality Assurance Project Plan
QA/QC	Quality Analysis/Quality Control
USEPA	United States Environmental Protection Agency

Certification of Satisfaction of Completion

Per Article XIV, Section 50 of the 2007 Consent Decree between the United States of America, the State of Indiana and Bayer Healthcare LLC, the undersigned certify the Remedial Action has been completed in full satisfaction of the requirements of the Consent Decree.

Douglas J. Riggs PE
Senior Engineer
Indiana PE No. 10809021

4/26/21

Randall Cooper
Senior Remediation Manager
Bayer US LLC

Certification of Completion

Per Article XIV, Section 50 of the 2007 Consent Decree between the United States of America, the State of Indiana and Bayer Healthcare LLC, the undersigned, as representative of Bayer Healthcare LLC, a Performing Settling Defendant of the 2007 Consent Decree, so certifies:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

4/26/21

Randall Cooper
Sr. Remediation Manager
Bayer US LLC

1 Introduction

The Himco Site in Elkhart, Indiana (the Site) was proposed for the NPL in 1988 and was placed on the NPL in 1990. The initial Record of Decision was issued in 1993 and subsequently amended in 2004 (2004 ROD). Groundwater & Environmental Services, Inc. (GES) was contracted by Bayer Healthcare LLC (Bayer) to document the completion of all Remedial Action (RA) activities completed at the Site per the 2004 ROD and Section XIV of the Consent Decree (USA and State of Indiana v. Bayer Healthcare LLC, et al-Civil Action NO: 2:07-cv-304-TS; effective November 28, 2007 (2007 CD)).

The United States Environmental Protection Agency (USEPA) issued a conditional approval of the RA activities completed in 2011 and 2012 on September 13, 2012. This addendum includes additional supporting material related to the site activities that have occurred since July 2012 to support Certification of Completion of the RA. This will also support site closure in accordance with the USEPA Close-Out Procedures for National Priorities List Sites (OSWER Directive 9320.2-22, May 2011).

2 Background

This section presents a brief description of the Site along with an overview of the RA requirements and a summary of the RA activities completed in 2011 and 2012 that culminated with the USEPA issuance of the "Superfund Preliminary Site Closeout Report –Final Remedial Action for the Himco Dump Superfund Site" on July 19, 2012 and the conditional approval of the Construction Completion Report/Completion of Remedial Action Report (CCR/CRAR) on September 13, 2012.

2.1 Site Description

The Site is a closed landfill located at the intersection of County Road 10 and North Nappanee Street in Cleveland Township, Elkhart County, Indiana. This former 60-acre unlined landfill, previously operated by Himco Waste Away Service, Inc., accepted waste including household refuse, construction rubble, medical waste, and calcium sulfate during its operation between 1960 and its eventual closure in 1976.

A Site Location Map is provided as **Figure 1**, showing the general location of the Site and surrounding area. A Site Map is presented as **Figure 2**, graphically depicting the layout of the Site, property boundaries, monitoring wells and neighboring properties. The Site consists of two major areas: the Landfill and the 4-acre Construction Debris Area (CDA). The CDA is located on the northern portion of seven residential properties and one commercial property that front onto [redacted]

Currently, the Site is a grassy field secured by a chain-link perimeter fence.

2.2 Remedial Action Requirements

The 2004 ROD documents the selected remedies for the site. An excerpt of the 2004 ROD detailing the selected remedial actions is included in **Attachment 1**. The Remedial Design/Remedial Action (RD/RA) which drove implementation of the selected remedies was conducted pursuant to the 2007 CD.

2.3 Construction Completion Report/Completion of Remedial Action Report

In 2011 and 2012, Bayer relocated CDA waste to the landfill, and completed construction of the landfill soil cover, passive gas venting system and related RA activities, thereby substantially completing the RA requirements of the 2004 ROD.

On June 14, 2012 a pre-final construction inspection was completed by the USEPA and Indiana Department of Environmental Management (IDEM). Corrective action items requiring additional work noted by the USEPA and IDEM during the inspection were documented in a June 21, 2012 USEPA letter to Bayer.

On June 29, 2012, Conestoga-Rovers & Associates (CRA) provided a Pre-Final Construction Report to the USEPA and IDEM for review describing the 2011 and 2012 site construction activities. Following USEPA and IDEM review of this report, USEPA issued a Superfund Preliminary Site Closeout Report on July 19, 2012.

On August 31, 2012, CRA submitted the CCR/CRAR to the USEPA and IDEM detailing the completed RA activities, including, but not limited to, well abandonment and city water connections, site clearing and waste removal, waste consolidation, soil cover system construction, surface water management and passive venting trench construction. A copy of the report is provided in **Appendix A**. On September 13, 2012, the USEPA issued a conditional Approval Letter of the CCR. A copy of the letter is provided in **Appendix B**.

3 Additional Remedial Action Activities

Following completion of the major activities documented in the conditionally approved CCR/CRAR, Bayer undertook the outstanding remedial actions as well as additional remedial actions as described below.

On March 1, 2016, the USEPA, with support from IDEM, completed the *First Five Year Review Report* for the Site. The subsequent five-year report documented two additional items requiring completion; the signing and recording of six additional environmental restrictive covenants (ERCs) and implementation of a long term stewardship (LTS) plan. These additional items constituted additional remedial actions requiring completion in order to fulfill the final RA activities for the Site and seek delisting of the Site from the NPL.

During July through September 2018, Gutteridge, Haskins and Davey (GHD) completed sampling of several private water wells in close proximity of the Site. The details of the private well sampling activities are provided in the *Private Well Sampling Report*, GHD, November 1, 2018. A copy of the report is provided in **Appendix C**.

On April 3, 2019, the USEPA provided a conditional approval letter for the initial submittal of the site LTS Plan. A copy of the approval letter is included in **Appendix D**. Following receipt of the letter, Bayer compiled and submitted the revised *Institutional Controls Implementation & Assurance Plan* (GHD, 2019). A copy of the plan is provided in **Appendix E**.

In May 2019, GES completed private well abandonment and connection to the city water service for ESM Auto Sales and connected 27947 Westwood Drive property to city water. This information is documented in the *Quarterly Progress Report – June 2019* (GES, 2019a). A copy of the report is provided in **Appendix F**.

The most recent groundwater monitoring event at the Site occurred in the fall of 2020. Details of the groundwater monitoring events from the fall of 2019 and fall 2020, are presented in the *2020 Annual Groundwater Monitoring Report* (GES, 2021). A copy of the report is provided in **Appendix G**. Groundwater monitoring activities at the Site will continue to include all current wells and parameters and will be conducted on an annual basis. The landfill inspection and soil gas monitoring efforts will also be conducted on an annual basis.

The final institutional control (IC) from Giada Holdings was signed and recorded on December 18, 2019. The IC was the only open ERC item related to the completion of all the items laid out in the *Institutional Controls Implementation & Assurance Plan* (GHD, 2019). A table listing all the IC's and ERC's associated with the Site is provided within the *Annual IC Monitoring, Compliance Assurance, and Certification Report* (GES, 2020) provided in **Appendix H**.

The Trust completes an annual compliance check of the ICs associated with the Site. The most recent annual compliance check is also documented in the *Annual IC Monitoring, Compliance Assurance, and Certification Report* (GES, 2020).

The following is a tabular chronology of the major events that have occurred since June 2012, including those described above:

Table 1 – Chronology of Events

Date	Activity
June 14, 2012	Pre-final construction inspection completed by the USEPA and IDEM.
June 29, 2012	CRA provides Pre-Final Construction Report to USEPA and IDEM
July 7, 2012	USEPA issues a Superfund Preliminary Site Closeout Report
August 31, 2012	CRA provides CCR to USEPA and IDEM to Detail well closure, City Water connections, waste consolidation and removal, soil cover construction
September 13, 2012	USEPA issues conditional approval letter of CCR

March 1, 2016	USEPA issues First Five Year Review Report
October 1, 2018	GHD issues Private Well Sampling Report detailing sampling of private wells from businesses and homes adjacent to the Site.
April 30, 2019	US EPA provides conditional approval of the LTS Plan and the revised Institutional Controls Implementation & Assurance Plan is submitted.
May, 2019	GES conducts private well abandonment at ESM Auto Sales and connects ESM Auto Sales and 27947 Westwood Drive property to City Water.
October 31, 2019	USEPA issues approval to switch to annual monitoring
November 19, 2019	GES submits 2019 Annual Groundwater Monitoring Report which details the Fall 2018 and Spring 2019 groundwater sampling events
December 18, 2019	Annual IC compliance inspection is completed and final IC related to the Site is signed and recorded (Giada Holdings).
December 21, 2020	GES submits Annual IC Monitoring, Compliance Assurance and Certification Report
February 8, 2021	GES submits 2020 Annual Groundwater Monitoring Report which details the Fall 2019 and Fall 2020 groundwater sampling events

4 Operation & Maintenance Activities

Bayer plans to continue long-term groundwater and soil gas monitoring on an annual basis in accordance with the LTS Final Operations & Maintenance Plan (GHD June 2012) until performance standards are met. In addition, annual inspection of the ICs will occur to ensure compliance and will be certified by Bayer in an Annual IC Monitoring, Compliance Assurance, and Certification report.

In the meantime, GES performed statistical analysis using the Monitoring and Remediation Optimization System (MAROS) software package developed by GSI Environmental, Inc. for the Air Force Center for Engineering and the Environment. GES also performed an additional analysis to verify the MAROS determination of trends for individual wells and constituents using the Groundwater Spatiotemporal Data Analysis Tool (GWSDAT) software package which was developed by Shell to provide interpolated groundwater concentrations of specified chemicals of concern (COCs) over time. GWSDAT also provides trend charts that plot observed analytical concentrations and confidence intervals for the trend. The MAROS and GWSDAT analyses are documented in the *2019 Annual Groundwater Monitoring Report* (GES; 2019). A copy of the report is provided in **Appendix I**. Review of the information provided within the *2019 Annual Groundwater Monitoring Report* (GES, 2019) led to the USEPA approval to conduct monitoring activities at the Site on an annual basis. A copy of an October 31, 2019 email from the USEPA documenting approval to move to annual sampling is provided as **Appendix J**. These analyses demonstrated that the groundwater plume remains stable and the remedy continues to be protective of human health and the environment.

5 Final Inspections and Certifications

Through the submittal and USEPA approval of a myriad of work plans; completion of the RA activities enumerated in the 2004 ROD; completion of the subsequent RA activities identified during the 2016 five-year review; USEPA approval of the CCR and subsequent reports documenting the completion of other RA requirements; and completion of the RA requirements documented herein, Bayer has satisfied the RA requirements of the 2004 ROD and 2007 CD. In addition to completion of all required RA elements described herein and the results of the annual groundwater and gas monitoring, remedy inspections, as well as confirmation that all IC's remain in place, Bayer believes the remedy is functioning as designed and remains protective of human health and the environment.

6 Contact Information

The following people are related to the project from the regulatory agencies and the Trust:

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Ms. Jennifer Simon, jsimon@kmcllaw.com
Legal Counsel
Kazmarek, Mowrey, Cloud, Laseter, LLP
1230 Peachtree Street, N.E.
Suite 900
Atlanta, GA 30309

7 References

Conestoga-Rovers & Associates. 2012. *Construction Completion Report /Completion of Remedial Action Report.*

Groundwater & Environmental Services, Inc. 2019a. *Quarterly Progress Report - June 2019*.

Groundwater & Environmental Services, Inc. 2019b. *2019 Annual Groundwater Monitoring Report*.

Groundwater & Environmental Services, Inc. 2020. *Annual IC Monitoring, Compliance Assurance and Certification Report*.

Groundwater & Environmental Services, Inc. 2021. *2020 Annual Groundwater Monitoring Report*.

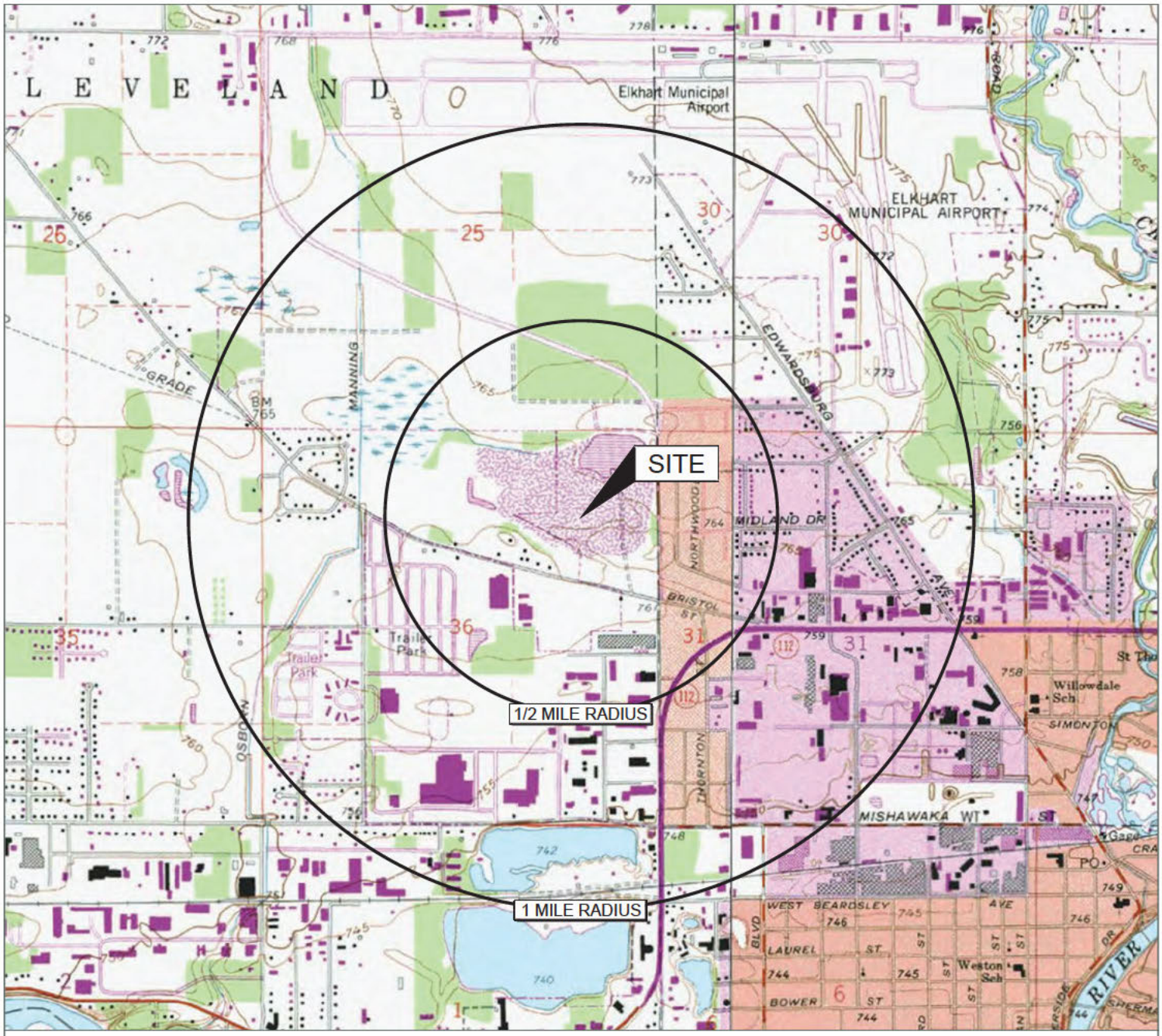
Gutteridge, Haskins and Davey 2018. *Private Well Sampling Report*.

Gutteridge, Haskins and Davey 2019. *Institutional Controls Implementation and Assurance Plan*.

United States Environmental Protection Agency. 2012. *Conditional Approval Letter*.

United States Environmental Protection Agency. 2019. *Email Approval for Annual Sampling*.

Figures



Source:
USGS 7.5 Minute Series
Topographic Quadrangle, 1994
Osceola, Indiana
Contour Interval = 5 feet
Township - 38 N
Range - 4 E
Section - 36

Quadrangle Location
LAT. 041 ° 42 ' 23.81 " N
LONG. 086 ° 00 ' 25.95 " W
(Approximate Site Coordinates)

Site Location Map

The HIMCO Site Trust
HIMCO Landfill
County Road 10
Elkhart, Indiana

Drawn
W.A.W.
Designed
W.A.W.
Approved
J.E.H

Date
08/13/19
Figure
1

Scale In Feet
0 2000

Groundwater & Environmental Services, Inc.

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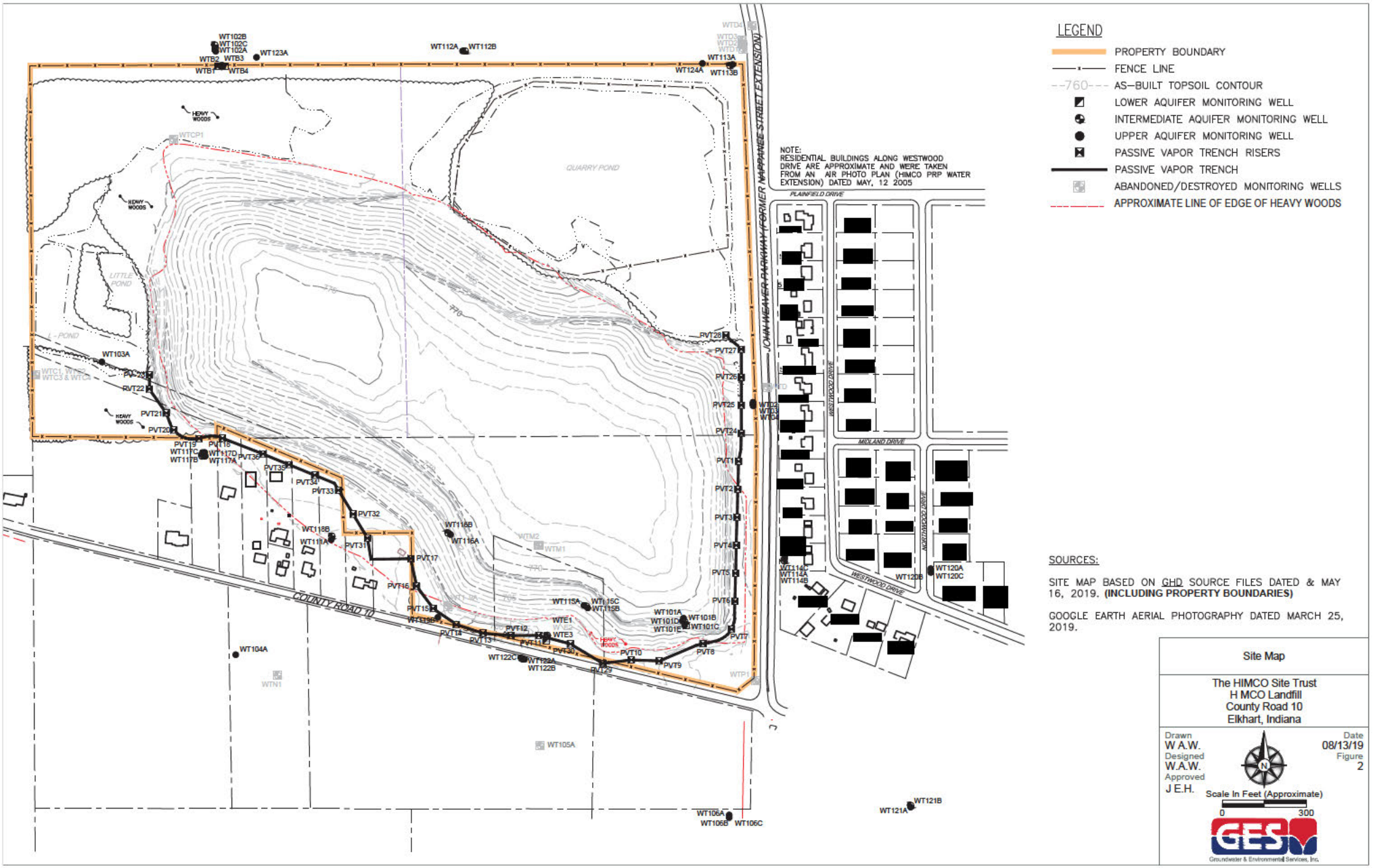

SOURCES:

SITE MAP BASED ON GHD SOURCE FILES DATED & MAY 16, 2019. **(INCLUDING PROPERTY BOUNDARIES)**

GOOGLE EARTH AERIAL PHOTOGRAPHY DATED MARCH 25, 2019.

Site Map

The HIMCO Site Trust
H MCO Landfill
County Road 10
Elkhart, Indiana

Drawn W.A.W.
Designed W.A.W.
Approved J.E.H.
Date 08/13/19
Figure 2

Scale In Feet (Approximate)
0 300

GES
Groundwater & Environmental Services, Inc.

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Attachment 1 - Remedial Action Requirements from the 2004 ROD

ATTACHMENT 1

Remedial Action Requirements from the 2004 ROD

The following was excerpted from Section 1.4 of the 2004 ROD:

The selected remedy for the 60 acre landfill

I . Contour and grade the existing cover:

- Conduct a pre-design investigation to characterize on-site soils (depth, nutrients, vegetation, grain size, etc.) in order to determine need for additional cover;
- Remove and dispose of on-site surface debris;
- Cover areas of exposed waste and in-fill surface voids and depressions with clean soil and suitable vegetation; grade the soil cover for proper drainage and erosion protection. It is anticipated that an 18-inch soil depth or more will be necessary to maintain vegetation and prevent exposure to on-site soils.
- Mitigate inadvertent exposure to waste materials in the future by recording or filing a deed notice regarding the landfill's site history and constituents; and
- Limit the land reuse to industrial, recreational, or commercial with institutional controls in the form of a deed restriction, or other appropriate ICs.

2. Construct the cover to avoid or minimize adverse effects on the wetlands;

3. Final grading of the total cover to no less than a two percent slope, after an accounting for the anticipated settlement;

4. For the gases migrating from the landfill, install a landfill gas collection and treatment system capable of collecting and treating all gases generated by the landfill. The landfill gas collection and treatment system shall, at a minimum, comply with all standards and requirements of 326 IAC 1-3, and shall include as necessary, a vapor phase carbon collection and treatment system and an enclosed ground flare system;

5. Conduct quarterly monitoring of the soil gas to assure that the gas collection system is functioning properly and meeting performance standards for duration of one year; semiannual monitoring for the next four years; and then reevaluate to determine the monitoring schedule for the next 25 years;

6. Periodic Inspections. A complete inspection of the landfill cover system, drainage

structures, landfill gas (LFG) system, LFG treatment system, if necessary, and groundwater wells. Periodic inspections will be performed on a quarterly basis during the first two years post-closure. Following this period, periodic inspection will be reevaluated to determine if the inspections could be conducted semiannually;

7. Institutional controls in the form of deed restrictions, or other appropriate institutional controls, which prohibit both future groundwater use, nrl future drilling or digging into the landfill cover will be implemented;

8. Institutional controls will be placed on the landfill in the form of a deed restriction or other appropriate ICs, to limit the land reuse to industrial, recreational, or commercial. However, a future land use feasibility study must be conducted by the entity responsible for the redevelopment of the property to determine the property's suitability for a particular reuse scenario. Any anticipated building construction on Himco Dump will have to be evaluated and approved by EPA, in consultation with Indiana Department of Environmental Management (IDEM) to determine the soil gas interaction/impact on any structures on the landfill, as well as the displacement of contaminated soils, wastes, etc;

9. Install a perimeter fence around the entire site for security. If the landfill is redeveloped the fence installation may not be necessary; and

I0. Conduct Operation and Maintenance (O&M) of all components of this remedy, which includes the vegetative cover, the soil gas collection system, and the ground-water monitoring system.

The selected remedy for the CDA and the residents living south of the landfill:

I. CDA Surface

   A. Remove all construction debris

   B. Remove all rubble

II. CDA Soil - The following two alternatives are protective and meet the RAOs for these materials.

   A. Excavate residential parcels in two feet intervals, up to six feet. Check sample results at each two feet intervals.

      a) Disposal of excavated materials
         1. Landfill

         2. Commercial Parcel F
            a) Fence as a part of the landfill
            b) Establish ICs in parallel with the landfil1

         3. Hazardous waste facility

      b) Backfill with clean soil

c) Vegetate

B. Cover CDA material with soil

a) Minimum of 18 inches of clean soil
b) Vegetate
c) Grade to allow for proper drainage
d) Fence area as a part of the landfill
e) Establish ICs in parallel with landfill

III. Commercial Parcel F

A. If the excavated residential soils are not consolidated to parcel F, then an institutional control in the form of a deed restriction, or other appropriate ICs will be applied to the parcel to be zoned as commercial/industrial only, since the 695 mg/kg of lead detected in the soil is an acceptable level for an industrial setting.

IV. Private residential welJs near CDA

A. Abandon private residential wells per 312 IAC 13-10-2, residences that were provided municipal water supply in 1991.

B. Establish institutional controls in the form of a deed restriction, or other appropriate ICs applied to each property to prohibit future installation of private wells for groundwater use.

The selected remedy for the residential area east and southeast of Dimeo Dump:

1. At a minimum, connect select residents (including the buffer zone) living on the east and southeast side ofHimco Dump to the local municipal water supply (21 select and 18 buffer zone residents for a total of 39 residents). See Table 14 for a list of the addresses to be connected to the municipal water supply;

2. Abandon all residential private water wells according to the requirements listed in 312 IAC 13-10-2 once the municipal water supply has been established. Establish institutional controls in the form of a deed restriction, or other appropriate ICs applied to each property to p10hibit future groundwater use; and

3. Install new monitoring wells in the buffer zone, based on the groundwater investigation study performed during the pre-design studies to monitor the vertical and spatial area where the residents are still using private wells. The new monitoring wells will be installed to capture all portions of the aquifer (shallow, intermediate and deep) to identify and correct any potential groundwater problem before the receptors are impacted.

The selected groundwater remedy and long-term monitoring at Dimeo Dump

1. Complete a pre-design groundwater investigation study on the south, east and southeast sides of Himco Dump to determine the contaminant concentration, rate and extent of migration of all detected contaminants. The investigation will include the vertical and spatial characterization of the contaminants to optimize the placement of

the additional long-term monitoring wells in the residential buffer zone area, and the landfill perimeter. One residential well to the east of the landfill noted 1, 2-dichloropropane contamination slightly above the MCL. The ROD Amendment calls for provision of a Public Water Supply to the surrounding area. It is believed that the 1976 closure of the landfill, the 1992 removal of drums, and the 2004 enhancement of the existing landfill cover, oupled with the monitoring requirements stated in this ROD Amendment are sufficient to address the contamination;

2. Establish a long-term groundwater monitoring program to monitor the future groundwater conditions from all of the monitoring wells associated with the landfill including the newly installed landfill and residential sentinel wells. The purpose is to determine if the groundwater RAOs are being exceeded which would trigger the need for potential connection to the municipal water supply beyond the buffer zone;

3. If at any time the groundwater monitoring program indicate the possibility that contamination from the landfill is migrating beyond the presently known location, the potential need for additional alternative water supplies will be evaluated, and an appropriate response action will be implemented;

4. Monitor all groundwater monitoring wells associated with Himco Dump for a minimum of 10 years; quarterly monitoring for the first two years. Samples collected from allof the groundwater monitoring wells will be analyzed for the following water quality parameters: Target Compound List (TCL) of Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), Polychlorinated biphenyls (PCBs), Pesticides, Inorganic Target Analyte List (TAL), water quality parameters (including groundwater indicators), and the human effective compounds. Based on the results, groundwater-monitoring frequency may *be* decreased to semiannually for the next three years. The monitoring results will *be* evaluated to aid in predicting contaminant trends, and evaluate seasonal effects. At the time of the five-year review (Superfund requirement for all Sites where waste remain on-site), the groundwater long term monitoring requirements will be reassessed to determine the continued frequency and duration at that time and

5. If during the long-term monitoring of the groundwater a hazardous chemical fails to meet the groundwater RAOs for four consecutive sampling events, a contingency remedy will be developed at that time to meet the performance standards of the RAOs and implemented to decrease the hazardous chemical's groundwater concentration back to below the groundwater RAOs.

1.2 LIST OF INSTITUTIONAL CONTROLS

Landfill Property

- Limit land use to industrial, recreational, or commercial uses either by recording a deed restriction or other appropriate institutional controls.

- Prohibit future groundwater use either by recording a deed restriction or other appropriate institutional controls.

- Prohibit future drilling or digging into the landfill cover either by recording a deed

restriction other appropriate institutional controls.

Residential Properties (East and South)

- Prohibit future installation of any private wells for groundwater use and abandon the private water well for each residential property after installation of the municipal water supply, per 312 IAC 13-10-2, applicable or relevant and appropriate requirements (ARARs). See Table 15, Himco Dump Well Abandonment List.

- Prohibit future installation of any private wells for groundwater use either by recording a deed restriction or other appropriate institutional controls.

- Prohibit the use of private wells in the area located south of Himco Dump located in the City of Elkhart up to the former Bower Street Well Field either by recording a deed restriction or other appropriate institutional controls.

Parcel F Located South of the Landfill

- Limit land use to industrial, or commercial only, either by recording a deed notice or other appropriate institutional controls.

Parcel F Located South of the Landfill

- Limit land use to industrial, or commercial only, either by recording a deed notice or other appropriate institutional controls.

Appendix A – Construction Completion Report/Completion of Remedial Action Report

www.CRAworld.com

FINAL REPORT

CONSTRUCTION COMPLETION REPORT/ COMPLETION OF REMEDIAL ACTION REPORT

HIMCO SITE
ELKHART, INDIANA

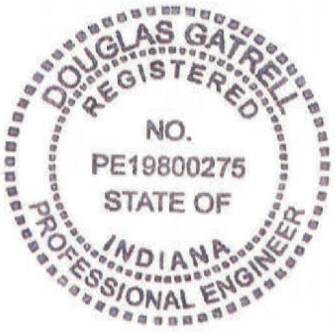
Prepared for: Himco Site Trust

Conestoga-Rovers & Associates
651 Colby Drive
Waterloo, Ontario N2V 1C2
Canada

To the best of my knowledge, I certify that the Remedial Action has been completed in full satisfaction of the requirements of the Statement Of Work.

Douglas M. Gatrell, P.E.
Indiana PE #PE19800275

Thomas M. Lenz, Performing Settling
Defendants Alternate Project Coordinator



To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Thomas M. Lenz, Performing Settling Defendants Alternate Project Coordinator

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LIST OF ACRONYMS

2H:1V	2 Horizontal: 1 Vertical
CD	Consent Decree
CDA	Construction Debris Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Closure Criteria	IDEM Residential and Industrial Default Closure Levels
CQA	Construction Quality Assurance
CQAP	Construction Quality Assurance and Performance Standard Verification Plan
CRA	Conestoga-Rovers & Associates
CRA, 2008	Remedial Design Work Plan
CRA, 2010	Final Design Report
DCB	Dichlorobenzene
100% Design Report	100% Final Design Report
FSP	Field Sampling Plan
ft AMSL	feet Above Mean Sea Level
HASP	Health and Safety Plan
HHRA	Human Health Risk Assessment
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
LFG	Landfill Gas
$\mu g/m^3$	micrograms per cubic meter
MHP	Material Handling Plan
mL	Milliliter
NPL	National Priority List
O&M Plan	Operation and Maintenance Plan
OSHA	Occupational Safety and Health Administration
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PPM	Parts per Millions
PVT	Passive Ventilation Trench
PSDs	Performing Settling Defendants

LIST OF ACRONYMS

PSV	Performance Standard Verification
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RAWP	Remedial Action Work Plan
RC	Remedial Contractor
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RD Work Plan	Remedial Design Work Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
ROD-A	Amended Record of Decision
SCS	Indiana Soil Conservation Service
SEC Donohue, 1992	Remedial Investigation and Feasibility Study
SGP	Soil Gas Probe
Site	Himco Site
SOW	Statement of Work
SSI	Supplemental Site Investigation
SSI/SCR	Supplemental Site Investigation/Site Characterization Report
SVOC	Semi Volatile Organic Compound
SWM Plan	Surface Water Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TAL	Target analyte list
TCE	Trichloroethene
TCL	Target Compound List
TMB	Trimethylbenzene
TSDF	Treatment Storage and Disposal Facility
USACE	United States Army Corps of Engineers
USACE, 1996	Final Design Analysis Report

LIST OF ACRONYMS

USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USEPA, 2002	USEPA's Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils
USCS	Unified Soil Classification System
VAS	Vertical Aquifer Sampling
VOC	Volatile Organic Compound

1.0 INTRODUCTION

The Performing Settling Defendants (PSDs), collectively known as the Himco Site Trust, retained Conestoga-Rovers & Associates (CRA) to prepare this Construction Completion Report (Report) for the Himco Site (Site) in Elkhart, Indiana. CRA prepared the Report in accordance with Section XIV, Paragraph 50 of the 2007 Consent Decree (CD) for Remedial Design and Remedial Action (RD/RA). This Report also satisfies Section IV, Item 15 and Item 16, which require both a construction completion report and a completion of remedial action report.

1.1 GENERAL

The Site is a closed landfill located at the intersection of County Road 10 and John Weaver Parkway (former Nappanee Street Extension) in Elkhart County, Indiana. The Site covers approximately 100 acres in the Northeast ¼ of Section 36, Township 38 North, Range 4 East in Cleveland Township, of which approximately 65 acres is the landfill proper. The landfill accepted waste including household refuse, construction rubble, medical waste, and calcium sulfate between 1960 and 1976. The landfill was closed and covered with a 1-foot layer of sand overlying a layer of calcium sulfate in 1976.

The Site location is shown on Figure 1.1. A Site plan is provided on Figure 1.2.

According to the Remedial Investigation and Feasibility Study (RI/FS) (SEC Donohue, 1992), the Site consists of two major areas: the calcium sulfate-covered landfill and the 4-acre construction debris area (CDA). The CDA was subdivided into seven residential properties and one commercial property parcel. The commercial property is not currently occupied or being used for any purpose. The CDA and its boundaries were defined primarily from 13 test trenches excavated in 1991 during the second phase of field studies for the Remedial Investigation (RI).

From 1974 to 1992, a number of environmental investigations were completed at the Site including a RI/FS in 1989-1992 by SEC Donohue. Before the implementation of the RI/FS, the United States Environmental Protection Agency (USEPA) added the Site to the National Priorities List (NPL) on February 21, 1990. Upon completion of the RI/FS, the USEPA issued a Record of Decision (ROD), executed on September 30, 1993, which identified the selected RA for the Site. Subsequent to the ROD, additional

environmental investigations were completed. An Amended ROD (ROD-A) was issued on September 15, 2004. The ROD-A provided for the remedial actions (RA) for the landfill cover, CDA soil removal, groundwater, and air components of the RD/RA for the Site. The RD/RA is being completed pursuant to the CD, which became effective on November 27, 2007. The lead Agency for the Site is USEPA Region 5. Indiana Department of Environmental Management (IDEM) is the support Agency.

Pre-design investigations commenced at the Site in 2008. Groundwater monitoring commenced in 2008 and is ongoing. In accordance with the CD, remedial design was completed in three stages (60%, 90%, and 100%). USEPA issued approval of the Pre-Design Investigation/100% Final Design Report (CRA, 2010) (hereafter referred to as the "Final Design Report") and notice to proceed with the Remedial Action Work Plan (RAWP) on July 21, 2010.

1.2 REPORT ORGANIZATION

This Report is organized as follows:

- Section 2.0 provides background information on the Site
- Section 3.0 describes the overall strategy for the RA, including the problem statement and a description of the remedial design and construction activities, including changes made to the design as construction proceeded
- Section 4.0 describes residential well abandonments and supply of municipal water to residents east of the Site
- Section 5.0 describes Site preparation activities completed at the onset of remedial construction
- Section 6.0 describes waste excavation and consolidation
- Section 7.0 describes the construction of the soil cover
- Section 8.0 describes surface water management
- Section 9.0 describes construction of the passive ventilation trench (PVT) and soil gas probes abandonment and installation
- Section 10.0 describes construction of ancillary features on Site, including Site access road
- Section 11.0 describes the meeting and inspections completed during the remedial construction

- Section 12.0 describes the operation and maintenance activities planned for the remedial action

The Record Drawings for the RA construction and the water main extension construction are provided with this report.

2.0 SITE BACKGROUND AND SETTING

2.1 SITE DESCRIPTION

The Site is a closed landfill located at the intersection of County Road 10 and John Weaver Parkway in Cleveland Township, Elkhart County, Indiana. According to the ROD-A, the Site accepted waste including household refuse, construction rubble, medical waste, and calcium sulfate between 1960 and 1976. Prior to the RA, the topography of the landfill was varied with two high points located on the northwest and east sides of the Site at an approximate elevation of 772 feet above mean sea level (ft AMSL). The elevation of perimeter of the landfill is approximately 761 ft AMSL. The landfill was closed and covered with a 1-foot layer of sand overlying a layer of calcium sulfate in 1976. The CDA bordering the southern perimeter of the landfill consisted of construction rubble mixed with non-native soil. Numerous small piles of rubble concrete, asphalt, and metal debris were scattered throughout the area. The calcium sulfate layer found at the landfill was not present in the CDA.

According to Supplemental Site Investigations/Site Characterization Report (SSI/SCR) (USEPA, 2002), the landfill and surrounding areas were initially marsh and grassland. No liner, leachate collection, or gas recovery system was constructed as part of the landfill. Refuse was placed at ground surface across the Site, with exception of trench filling in the eastern area of the Site. In this area, the Site operator excavated five trenches 10 to 15 feet (ft) deep, the width of a truck and 30 ft long. Paper refuse was reportedly dumped in the trenches and burned. The exact locations of these trenches within the landfill are unknown. Approximately two thirds of the waste in the landfill is calcium sulfate (SEC Donohue, 1992). Other wastes accepted at the landfill included demolition/construction debris, household refuse, and industrial and hospital wastes. The landfill had no specifically-defined borrow source, but obtained sandy soil for daily cover from an abandoned gravel pit to the north, ponded areas to the west, and essentially anywhere around the perimeter of the Site where sand was available.

The abandoned gravel pit north of the Site, commonly referred to as the Quarry Pond, is filled with water. The two other smaller ponds on the west side of the Site are commonly referred to as the L Pond and the Little Pond. The typical surface water elevation ranged from 754.5 to 755.3 ft AMSL in November 2008.

The waste on Site is in contact with the water table. The RI/FS states that residents near the Site reported complaints of color, taste, and odor problems in shallow water supply

wells as early as 1974. Deeper potable water supply wells were installed for some residents in the 1970s. The USEPA Emergency and Response Branch sampled these wells in late April 1990. Elevated concentrations of sodium in samples from these deeper water supply wells eventually led to the USEPA's requirement to supply municipal water to the residents south of the Site in 1990.

2.2 SUMMARY OF INVESTIGATIONS

On behalf of the USEPA, SEC Donohue completed the RI in 1991-1992 to characterize the contamination in soil samples collected from the landfill cover and areas next to the cover. SEC Donohue also sampled soil in the CDA during the 1998 SSI to characterize the nature of soil contamination.

The first attempt at defining the limit of waste occurred in 1992 using a combination of geophysical surveys, test pit and soil boring observations, and examination of aerial photos (SEC Donohue, 1992). The limit of waste of the landfill was further defined in 1996 using information contained in the Final Design Analysis Report (United States Army Corps of Engineers [USACE], 1996).

The USACE completed two supplemental soil gas investigations that were performed between 1998 and 1999. The 1998 soil gas investigation concentrated primarily on the area south of the landfill to County Road 10, with limited investigations east of the landfill towards John Weaver Parkway.

In order to further delineate and understand the extent of conditions on-Site, CRA completed a pre-design investigation in accordance with the RD Work Plan (CRA, 2008). The pre-design investigation was designed to delineate the limits of the landfill and characterize on-Site cover soil, where present, for thickness, nutrients, vegetation, and grain size. CRA also sampled soil in the CDA, landfill gas (LFG)/soil gas, and groundwater to supplement existing information and aid in the development of an appropriate remedy. The remedy addresses the CDA, the main landfill, and will prevent off-Site migration of LFG/soil gas present at the Site.

The pre-design investigation consisted of advancing 246 landfill cover soil borings, excavating 17 test trenches and five test pits, completing vertical aquifer sampling (VAS) at eight locations, installing 29 soil gas probes, collecting 74 soil samples (including quality assurance/quality control [QA/QC] samples), collecting 62 groundwater

samples from monitoring wells, collecting 121 samples from VAS boreholes, and collecting 61 soil gas samples (including QA/QC samples).

The landfill limit delineation determined that the actual limit of waste in the west, in the northeast sides of the landfill and the southeast part of the CDA varied significantly from the 1996 landfill limit.

The 2009 landfill limit of waste line, as defined by CRA, was produced using historic data, the results of the test trenches, and other data collected during the pre-design investigation.

The soil cover investigation determined the following:

- The thickness of soil cover at the investigated soil boring locations varied from 0 to 2 ft, the average thickness of cover at the boring locations was approximately 0.8 ft, and approximately one third of the boring locations at the Site had 0 to 0.4 ft of existing soil cover
- The Unified Soil Classification System (USCS) soil classifications for samples collected from the landfill soil cover were a poorly graded sand, gravelly sand, or silty sand
- The results of the analysis were not conclusive as to the ability of the landfill soil cover to grow vegetation based on criteria provided from A & L Great Lakes Laboratories, Inc., and the amount of coverable cover soil was too small to make it cost effective for reuse
- Of the 21 soil sample locations where samples contained volatile organic compounds (VOC) detections, none of the sample concentrations were greater than the IDEM Residential and Industrial Default Closure Levels (closure criteria)

The December 2008 soil samples collected within the CDA contained several polynuclear aromatic hydrocarbons (PAHs) in both surface and subsurface soil samples, and two semi-volatile organic compounds (SVOCs) (bis[2-Ethylhexyl]phthalate and dibenzofuran). Eighteen of the 23 target analyte list (TAL) metals were detected at least once. Arsenic was detected at concentrations greater than the closure criteria in soil samples from the CDA. Lead was detected at concentrations less than the closure criteria in soil samples collected from the CDA. The December 2008 soil samples illustrated that criteria exceedances were detected in samples from two locations adjacent to the landfill and on residential properties. Soil samples collected at one

location in the southern portion of the landfill also contained parameter concentrations at concentrations exceeding the closure criteria.

Concentrations of seven VOCs (1,2,4-trimethylbenzene [TMB], 1,3,5-TMB, 1,4-DCB, benzene, perchloroethylene [PCE], trichloroethylene [TCE] and vinyl chloride) in LFG/soil gas samples collected at two locations on the southeast corner of the landfill exceeded the IDEM Indoor Air Criteria.

A detailed summary of analytical data collected historically at the Site is provided in the RD Work Plan (CRA, 2008) and in the Final Design Report (CRA, 2010).

2.3 SITE SETTING

The Site is bordered to the north by the Quarry Pond and agricultural land; to the east by John Weaver Parkway and beyond by residential properties; to the south by residential properties and County Road 10; and to the west by undeveloped land and agricultural properties.

The Site is currently fenced. Locked access gates are present at the southeast corner of the Site and near the southwestern corner of the Site. A man gate is located on the west side of the Site.

3.0 OVERALL STRATEGY AND DESIGN

3.1 PROBLEM

The landfill accepted waste including household refuse, construction rubble, medical waste, and calcium sulfate between 1960 and 1976. The landfill was closed and covered with a 1-foot layer of sand overlying a layer of calcium sulfate in 1976.

According to the RI/FS (SEC Donohue, 1992), the Site consists of two major areas: the calcium sulfate-covered landfill and the 4-acre CDA. The CDA includes seven residential properties and one commercial property parcel. The commercial property is not currently occupied. The CDA and its boundaries were defined primarily from 13 test trenches excavated in 1991 during the second phase of field studies for the RI.

The results of the human health risk assessment (HHRA) indicate a potential for risk to age-adjusted residents, child residents, and construction workers if exposed to the soil within the CDA or groundwater migrating from the Site through inhalation, ingestion and dermal contact pathways. Primarily, the exposure compounds include metals such as antimony, arsenic, copper, manganese, and VOCs such as benzene and 1,2-dichloropropane. As a result of the potential risk, areas of exposed waste were covered and a passive ventilation trench was installed to intercept gases migrating from the landfill and provide a preferential pathway to be vented to the air. The landfill cap will minimize the potential threat to users and trespassers on Site while the landfill gas collection system will minimize receptor exposure to gases departing from the Site.

3.2 REMEDY

On behalf of the PSDs, CRA completed a pre-design investigation in accordance with the RD Work Plan (CRA, 2008). The pre-design investigation is summarized in Section 2.2 of this Report. The pre-design investigation data were used to design the remedy, as summarized in the Final Design Report (CRA, 2010).

The remedy included:

1. Excavation and relocation of soil and debris within the CDA
2. Backfilling of CDA
3. Consolidation of waste and shaping of landfill

4. Construction of landfill cover
5. Construction of landfill gas PVT
6. Installation of soil gas probes
7. Construction of Site access road and ancillary features

The PSDs retained the construction division of CRA to construct the remedy and act as Remedial Contractor (RC). CRA commenced remedial construction in March 2011, and completed construction in June 2012, with a break for winter from December 2011 to April 2012. A photographic log of the RA construction activities is provided as Appendix A.

3.3 DESIGN CHANGES

Following USEPA approval of the RD and throughout remedial construction, CRA proposed several modifications to the RD to improve the remedy or adapt it to better suit Site conditions. The design changes reviewed and approved by USEPA included:

- Modification of soil specification
- Modifications of the Construction Quality Assurance and Performance Standard Verification Plan (CQAP) Tables 3.1 and 4.1.
- Approval of analytical detection limits greater than the IDEM Risk Integrated System of Closure (RISC) default residential soil concentration level
- Reduction in real-time air monitoring duration
- Cessation of air monitoring program during clean work activities
- Waste settlement and revised contour design (discussed in Section 7.1)

CRA also adapted the design of the access roads to match existing Site conditions. Each of these design changes are discussed in this Report. The as-built details are recorded on the Record Drawings, attached to this Report.

4.0 RESIDENTIAL WELL ABANDONMENT AND MUNICIPAL WATER SUPPLY

In accordance with Section II, Item 4.3.1 of the SOW, the PSDs abandoned 40 private water supply wells and connected 37 residents to municipal water supply. The work at residences east of the Site was completed between August 2009 and December 2009. Residential wells south of the Site were abandoned in July 2012. The work was completed in accordance with the Remedial Design Work Plan – Residential Well Abandonment and Municipal Water Supply (Water Supply Work Plan) (CRA, 2008).

4.1 RESIDENTIAL WELL ABANDONMENT

The SOW listed 46 residences as requiring well abandonment. In accordance with the Water Supply Work Plan, CRA searched the Indiana Department of Natural Resources (IDNR) database to obtain private well records, where available. In most cases, and as stated in the Water Supply Work Plan, CRA inspected the property to assess the depth and location of the supply well, and gathered information on the pump and/or piping to be disconnected.

Table 4.1 presents the list of residential water supply wells abandoned by the PSDs per the SOW. J.W. Bowles Well Drilling abandoned 37 residential wells east of the Site in December 2009, and Stearns Drilling abandoned three wells south of the Site in July 2012. The approximate location of the abandoned wells is shown on Figure 4.1. The type and depth of well found at each location is summarized in Table 4.1.

The residences south of the Site along [redacted] have been connected to municipal water supply since the 1990s. The status of the private water wells on those properties was not known, and although historic reports for the Site listed up to nine wells south of the Site, some of these wells may have been abandoned or destroyed. In June 2012, CRA inspected the [redacted] properties listed in the SOW for which the PSDs had access, and located three water supply wells. Stearns Drilling abandoned two residential wells at [redacted] and one well at [redacted] in July 2012.

As communicated to USEPA throughout the project, the PSDs were unsuccessful in securing access to several properties listed in the SOW despite numerous attempts and financial incentives offered between 2007 and 2012. These properties include:

[redacted]

The PSDs did not have written access to two abandoned properties [redacted] The PSDs proceeded with inspections of the property (outside of the buildings) and well abandonment in order to satisfy the requirements of the SOW.

Prior to the well abandonments, CRA measured the groundwater elevation and the total depth of the well. All residential well abandonments were completed in accordance with Indiana Administrative Code, 312 IAC 13, Rule 10.

The general sequence for well abandonment was as follows:

- Locate the well
- Remove the pumping equipment
- Chlorinate the well
- Backfill the well with neat cement, bentonite slurry, or pelletized bentonite
- Cut the well casing off 2 ft bgs
- Cap the well if possible
- Install a cement plug over the well
- Restore the ground surface at the well
- File a well abandonment report with the IDNR

Wastes, including pumps, drop pipes, and other equipment in the well, were removed from each property unless the resident requested that the material was to be left at the property.

Well abandonment logs are provided in Appendix B. A photographic log of the well abandonments of [redacted] and [redacted] is also provided in Appendix B.

4.2 WATER MAIN EXTENSION

In accordance with Section II, Item 4.3.2, of the SOW, the PSDs constructed a water main extension to supply municipal water to residents on Westwood Drive and Northwood Drive in Elkhart, Indiana. The PSDs obtained access agreements for 37 out of 39 residents. As summarized in Table 4.2, residents of [redacted] and [redacted] refused the municipal water, and did not sign the access agreement, despite financial incentives offered by the PSDs. The PSDs did not connect these residences to the water main extension.

CRA designed the water main extension and received City of Elkhart approval of the design. The Himco Site Trust retained John Boettcher Sewer & Excavating (JBSE) to construct the water main extension between August 2009 and December 2009. The water main extension was constructed on Plainfield Drive, Westwood Drive, Midland Drive, Northwood Drive and Highland Boulevard and is shown on Figure 4.2 and in the attached as-built drawings.

The water main extension consisted of:

- 4,186 ft of 12-inch ductile iron pipe
- 852 ft of 8-inch ductile iron pipe
- Five hydrants
- 37 taps and connections

The PSDs dedicated the water main extension to the City of Elkhart, and was accepted by the City of Elkhart on April 6, 2010. The Dedication and Acceptance of the water main extension is provided in Appendix C.

5.0 SITE PREPARATION

5.1 HEALTH AND SAFETY

CRA implemented the Health and Safety Plan (HASP) in Appendix R of the Final Design Report during remedial construction activities. The HASP was amended, as appropriate, during remedial construction. The HASP provided specific guidelines and procedures for the protection of personnel performing remedial construction activities.

The HASP was developed in accordance with applicable standards and defined the following:

- Levels of protection
- Safe work practices and safe guards
- Medical surveillance
- Personal and environmental air monitoring
- Personal protective equipment
- Personal hygiene
- Decontamination for personal and equipment
- Site work zones
- Contaminant control
- Contingency and emergency planning
- Logs, reports and record keeping

CRA provided a Site-specific HASP orientation to Site workers and visitors. CRA maintained daily sign-in sheets and health and safety records on Site during construction. CRA implemented the Air Monitoring Program (AMP) in accordance with the HASP when excavation commenced on Site. The AMP is described in Section 6.1 of this Report.

5.2 PERMITS

CRA obtained the following registrations and permits from the City of Elkhart and Elkhart County:

- Registered Excavation Contractor with the City of Elkhart, Indiana
- Excavation Permit for water meter installation with the City of Elkhart Engineering
- Road Restriction Permit with the City of Elkhart Engineering
- Stormwater Pollution Prevention Plan (SWPPP) with Elkhart County

5.3 SITE CLEARING AND SURFACE WASTE REMOVAL

CRA commenced Site clearing and Site preparation on March 7, 2011. CRA cleared and grubbed trees and vegetation within the footprint of the landfill. Large diameter trees outside of the RA construction area and along the perimeter of the landfill were left in place. As requested by USACE, CRA and USACE walked the Site in March 2011 in advance of clearing any large trees to confirm that there was no evidence of nesting raptors in the areas to be cleared.

In accordance with the Final Design Report, CRA transported materials unsuitable for placement under the soil cover off Site for disposal. Three 30-cubic-yard roll-off boxes of large appliances (refrigerators, stoves, washers, and dryers) were shipped off Site to OmniSource for recycling and disposal. CRA shipped 730 passenger car tires, 47 truck tires and 2 oversize tires to Deerpath Recyclers for recycling and/or disposal. CRA disposed of 34.21 tons of non-hazardous construction and demolition debris and municipal trash that could not be compacted, such as furniture cushions and foam rubber, at Waste Management Earthmovers Landfill.

CRA completed clearing and grubbing activities on Site in April 2011. The City of Elkhart requested that the wood chips generated from tree removal be donated to the City for use on City properties, rather than on Site. On April 5, 2011, USEPA and USACE approved this request. CRA shipped approximately 6,000 cubic yards (yd^3) of wood chips off Site to the City of Elkhart's storage yard.

During Site clearing activities on March 9, 2011, CRA uncovered metal debris that was suspected asbestos containing material (ACM). The PSDs sampled the debris and

confirmed that it contained ACM. CRA retained Diamond Environmental Services Inc. (Diamond) to remove and dispose of the ACM. Diamond is an IDEM certified Asbestos Contractor in accordance with Title 326 Air Pollution Control Board of the Indiana Administrative Code (IAC) Article 18 Asbestos Management (326 IAC 18). Diamond removed approximately 333 yd^3 of ACM from the Site between May 3 and May 16, 2011. The ACM was transported off Site for disposal by Industrial Disposal & Recycling at the Elkhart County Landfill in Elkhart, Indiana. The ACM sampling report and waste profiles are presented in Appendix D.

6.0 WASTE EXCAVATION AND CONSOLIDATION

During the pre-design investigation field activities, CRA advanced boreholes and excavated test trenches to determine the soil cover thickness and existing edge of waste. The landfill waste footprint covered approximately 65 acres. In order to have adequate room for the final cover system, as well as ancillary features around the perimeter, waste was excavated from five areas on Site in accordance with the RD. The five waste excavation areas are shown on Drawing No. 3. CRA excavated 79,250 yd^3 of waste from the five areas and relocated it to create the final waste layer in accordance with the RD. The approximate area of the consolidated waste is 50 acres. The excavation areas are described further, below.

6.1 PERIMETER AMBIENT AIR MONITORING

CRA completed perimeter air monitoring and sampling in accordance with the AMP in the HASP. The intent of the AMP was to ensure that dust and vapors did not migrate off Site at concentrations that could potentially impact off-Site receptors.

The long-term air monitoring program in the HASP specified that air monitoring at the perimeter of the Site shall be over a 24-hour period. CRA requested that USEPA approve long term monitoring during the active excavation period, which represents the worst case scenario for potential off-Site migration of VOCs or dust. USEPA approved this modification by email on April 21, 2011.

As described in the AMP, perimeter air monitoring and sampling stations were set up at each side of the Site perimeter (i.e., North, South, East, and West) and are shown on Figure 6.1.

CRA completed real-time air monitoring of undifferentiated VOCs and particulate matter less than 10 microns in diameter (PM10). Real-time monitoring was completed during the first week of each perimeter excavation, landfill regrading activities, placement of the rooting zone layer and during intrusive waste excavation for the PVT. CRA inspected the real-time monitoring equipment throughout the day to ensure proper operation of equipment and to troubleshoot or repair the equipment, when necessary. The real-time air monitoring equipment was exposed to environmental conditions (i.e., wet weather, humidity, etc.) and normal wear and tear from repetitive

use of the equipment. This resulted in occasional, short-term interruption to real-time air monitoring data collection.

CRA reviewed real-time monitoring data from the work area and compared the data to the action levels in the AMP. Action levels set out in the AMP were not exceeded during perimeter air monitoring at any point during remedial construction.

CRA collected perimeter air samples for laboratory analysis during the first week of the excavation work at the North (Northwest & Northeast), West, CDA and Southeast excavations. The samples were analyzed for Target Compound List (TCL) VOCs, TCL SVOCs, and TAL metals. None of the air samples contained analytes at concentrations that exceeded the criteria set out in Table 6.7 of the AMP. The monitoring and analytical data are presented in Appendix E.

During the November 2011 progress meeting, CRA requested that the perimeter AMP be terminated. The AMP was designed to be protective of on-Site workers and off-Site receptors during waste excavation and soil import activities. There were no exceedances the AMP action levels during the construction phase in 2011. As approved by USEPA on November 8, 2011, CRA did not resume the AMP in spring 2012 since the waste excavation work was complete.

6.2 SOUTH EXCAVATION AREA/CDA

On April 28, 2011, CRA commenced clearing activities on residential properties within the CDA, including removal of perimeter fencing and the residents' own debris. CRA also relocated barns, sheds, and other items stored within the limits of the excavation area. CRA cleared the trees within the CDA area in May 2011. As of June 2011, four of five residents of the occupied properties had signed the access agreement. On June 27, 2011, CRA commenced excavation activities in the CDA, and consolidated the excavated materials on the landfill footprint. The PSDs negotiated at length with the resident at [redacted] and obtained limited access to the property to excavate impacted soil and debris in September 2011. CRA completed the CDA excavation and backfilling activities on October 5, 2011.

Rather than excavate in an iterative process that would prolong the inconvenience to the residents of the properties within the CDA, the PSDs elected to excavate soil and debris in the CDA to a depth of 6 ft bgs. As shown on Figure 6.2, construction debris was

observed south and east of the anticipated limit of excavation as defined during the pre-design investigation. Excavation activities continued southward and eastward until there was no visible evidence of debris or until CRA reached the landfill limit or southern property line. Waste left in place south of the southern property line is discussed further in Section 6.2.1.

CRA collected 17 confirmatory samples at 6 ft bgs on a 100-foot grid. A minimum of one sample was collected from each property, as shown on Figure 6.2 and summarized in Table 6.1. One confirmatory soil sample was collected on October 5, 2011 after ultimately obtaining access from the final resident of the CDA. The soil samples were analyzed for TAL metals, TCL VOCs, and TCL SVOCs. The analytical results are summarized in Table 6.2, and the analytical laboratory reports are present in Appendix E.

Following excavation and sample collection in the CDA, CRA backfilled the excavation with clean imported fill and topsoil, and seeded the area. On behalf of the PSDs, CRA also restored or replaced barns, fences, and other improvements to the satisfaction of each property owner.

6.2.1 BRICK LAYER IN CDA EXTENDING SOUTH OF PROPERTY LINE

As shown on Drawing No. 3 and Figure 6.2, the CDA waste extended east and south of the anticipated limits of the CDA as defined by historic data and the pre-design investigation. A thin (1 foot thick or less) layer of bricks extends south of the property line into the right-of-way for [redacted] The right-of-way contains active buried and overhead utilities that precluded safe excavation of the bricks. The brick layer is covered with 2 ft or more of existing cover soil that prevents human contact with the bricks. As discussed with the USEPA, CRA collected samples to characterize the existing soil cover in August 2011 and confirm that no further action was required to address the bricks.

As summarized in a CRA memo dated September 22, 2011 (see Appendix F), CRA collected three soil samples (SO-BRICKS-081011, SO-10EAST-08252011, and SO-10WEST-082511) over a 20 foot area in the right-of-way. The samples were collected from soil overlying the bricks, approximately 12 inches bgs. The samples were collected on August 10 and August 25, 2011. CRA also collected two background samples (SO-100EAST-081011 and SO-100WEST-081011) approximately 100 ft east and west of

sample SO-BRICKS-081011 to determine if the soil covering the bricks was different from the other existing soil in the right-of-way. Sample locations are shown on Figure 6.2. Soil samples were analyzed for TCL VOCs, TCL -SVOCs, TAL metals, and moisture content. The analytical results are presented in Appendix F.

CRA compared the soil data from the soil cover samples to the background sample data. There are no existing applicable criteria that apply to soil in the road right-of-way. CRA also compared the data to the IDEM RISC Default Closure Levels for both residential and industrial land use for discussion purposes.

The analytical data show that:

- The concentrations of VOCs, SVOCs, and metals in the samples collected from soil cover over the bricks are very similar to those in the background soil samples collected outside of the area of bricks.
- No VOCs or SVOCs were detected in any of the samples at concentrations greater than the RISC Default Closure Levels for both residential and industrial land uses.
- Arsenic was the only parameter detected at a concentration greater than the background samples or IDEM RISC Default Closure Levels. Arsenic was detected in one of the three soil cover samples at a concentration of 10 milligrams per kilogram (mg/kg), which is slightly greater than the IDEM RISC Default Closure levels for residential properties (3.9 mg/kg) and industrial properties (5.8 mg/kg). The background samples contained 4.3 mg/kg (east) and 3.3 mg/kg (west) of arsenic. The concentration of arsenic in the eastern background sample also exceeded the IDEM RISC Default Closure Level for residential land use.

As discussed with USEPA and IDEM during the monthly Progress Meeting on September 14, 2011 and as summarized in CRA's September 22, 2011 memo, the IDEM RISC Default Closure Levels are intended for residential and industrial land use, and are overly conservative when applied to a road right-of-way. Although arsenic has been detected in historic soil samples on Site, it is naturally occurring. The maximum detected concentration of arsenic in the soil cover samples is only slightly greater than the background value for arsenic (7.5 mg/kg) for Indiana as listed in Appendix A Background Soil Concentration Database of Attachment 1-4 Guidance for Developing Ecological Soil Screening Levels, November 2003 and revised in July 2007.

CRA calculated risk based criteria (RBC) to confirm that the maximum detected concentration of arsenic in the soil does not pose an unacceptable risk to human health. CRA calculated RBC for likely exposure scenarios for the right-of-way, including an adolescent trespasser and a construction worker completing infrequent maintenance and/or repairs in the road right-of-way. For both scenarios, CRA considered exposure through oral, dermal and inhalation pathways to evaluate potential risk. As summarized in CRA's September 22, 2011 memo, the calculated RBCs for arsenic for the adolescent trespasser and the construction worker scenarios are 96 mg/kg and 490 mg/kg, respectively. These calculated RBCs are significantly greater than the maximum arsenic concentration detected in the characterizations samples (10 mg/kg).

Based on the data collected and the above evaluation, the existing soil cover over the brick layer south of the CDA is sufficient to prevent contact with the bricks, and is of a quality that is generally consistent with soil in the vicinity of the Site. IDEM indicated that the concentrations of arsenic detected in the soil samples from the right-of-way were not unusual for the area, and IDEM was not concerned about the concentrations detected. The risk associated with excavating the brick layer in the right-of-way for County Road 10 was significantly greater than any benefit obtained by relocating the bricks to the landfill. In a September 28, 2011 email, USEPA agreed that leaving the bricks in place was acceptable and no further action was required.

6.3 SOUTHEAST PERIMETER EXCAVATION ALONG JOHN WEAVER PARKWAY

As shown on Drawing No. 3, waste material along the southeastern portion of the Site extended off Site and into the right-of-way for John Weaver Parkway. The waste in the southeast excavation was 6 ft or more thick, with at least 4 ft of calcium sulfate overlying the landfill waste. In August 2011, CRA filed a Notice of Road Restriction with the City of Elkhart and obtained City approval to complete investigative activities on the southbound lane easement of John Weaver Parkway. On August 22, 2011, CRA closed the south-bound lane of John Weaver Parkway, and set up temporary fencing to secure the work area. On August 23, 2011, Bloodhound Underground (Bloodhound) performed vacuum extraction investigations at 15 locations along the right-of-way to define the limit of waste. CRA then completed five test trenches and confirmed that the waste extended approximately 5 to 8 ft east of eastern property line.

CRA initiated clearing and grubbing on August 26, 2011 to facilitate excavation activities along the right-of-way. CRA excavated approximately 3,800 yd^3 of waste from the right-of-way between September 6 and 9, 2011 and relocated it to a location within the RD landfill limits. CRA backfilled the excavation with common fill, 12 inches of rooting zone material, and 6 inches of topsoil. CRA re-installed the Site perimeter fence and planted 26 trees in the right-of-way in accordance with the City's restoration guidelines.

In accordance with the Final Design Report, CRA determined the lateral extent of the excavation based on field observations and test trenches and visually confirmed that all waste materials had been excavated in the southeast excavation. As discussed with the USEPA in the September 2011 Construction Progress Meeting, confirmatory soil samples in the southeast excavation were not required in accordance with the excavation procedures for the perimeter excavations as outlined in the Final Design Report.

6.4 LANDFILL WATER MANAGEMENT

Groundwater was encountered at approximately 5 to 6 ft bgs in the CDA and at approximately 8 to 10 ft bgs in the southeast excavation. CRA collected a groundwater/leachate sample from a test pit in the southeast excavation on March 30, 2011. The groundwater/leachate sample was analyzed for TCL SVOCs, TCL VOCs, TAL metals, and selected general chemistry parameters. CRA submitted analytical data for the leachate characterization sample to the USEPA on May 5, 2011, in accordance with the Final Design Report (see Appendix E).

CRA constructed an infiltration gallery for groundwater that interfered with excavation activities. The infiltration gallery was approximately 20 ft by 60 ft, and 2 to 6 ft deep, as shown on Drawing No. 2. The groundwater was pumped into the gallery at a flow rate that avoided free standing liquid. Temporary berms were constructed immediately adjacent to the infiltration gallery for additional containment and erosion control. CRA relocated the infiltration in July 2011 to accommodate Site activities. The second infiltration gallery was approximately 300 ft east of the first infiltration gallery.

CRA attempted to quantify groundwater that was recirculated back into the landfill, but experienced difficulties with chronic fouling of the flow metering equipment. At times the flow rates were too low for the flow meter to accurately measure. CRA estimates that the volume of groundwater pumped to the infiltration gallery was on the order of 500,000 to 800,000 gallons.

7.0 SOIL COVER SYSTEM CONSTRUCTION

The landfill cover consists of (from bottom to top):

1. Minimum of a 12-inch rooting zone layer
2. Minimum of a 6-inch topsoil layer

Upon completion of relocation of waste from the five perimeter excavation areas, CRA shaped the landfill surface in accordance with Drawing No. 4 of the revised Final Design. This included excavation of a significant volume of waste from the northern portion of the Site, and relocation of the waste to the southern portion of the Site. After waste excavations were completed, side slopes were graded at 6 percent from the revised limit of waste and the top slope was graded at 2 percent. The final contours were prepared to the same slope as the waste relocation contours over the landfill surface.

The excavated materials from the perimeter of the Site were located into low-lying areas within the landfill and subsequently covered with common fill. Drawing No. 13 presents the cut/fill areas for the Site.

7.1 REVISED CONTOUR DESIGN AND SETTLEMENT

Section 5.4 of the Final Design Report allows the PSDs to modify the final contours to minimize the volume of clean imported fill to the Site while maintaining the minimum side slopes for the final landfill cover. In June 2011, CRA revised the elevation and contours for the final landfill cover to reduce the volume of imported fill by approximately 60,000 yd^3. CRA reviewed the revised design drawings with USACE representatives in May 2011, who concurred with CRA's approach. The reduced quantities of imported fill material also reduced the volume of truck traffic on City and County streets during the construction period.

In a June 2, 2012 email, USEPA concurred that such changes were allowable and that no further approvals were required.

The final landfill contours are shown on Drawing No. 5.

Based on QA/QC survey data, CRA observed settlement following placement of the rooting zone layer on the graded waste layer on the western portion of the landfill. CRA installed settlement plates to monitor potential settling of the soil layers. In some areas, where 12 inches or greater of rooting zone material had been placed and verified, the landfill settlement meant that the final elevation of the cover would not equal the final elevations specified on the RD drawings. CRA proposed to monitor the settlement by installing survey stakes on a 50-foot-by-50-foot grid to monitor the thickness of the rooting zone and topsoil layers. An independent survey certification was performed to verify that required soil thickness was achieved. Survey stakes were installed with a minimum of two stakes per acre, or as appropriate based on field conditions. Settlement plates were installed to confirm and measure soil layer thickness. In an August 24, 2011 email, USEPA approved CRA's approach to monitor the soil settlement and to modify the design contours. CRA also reviewed the stormwater drainage berm design to ensure that the stormwater drainage patterns were not affected by settlement.

7.2 CONSTRUCTION QUALITY ASSURANCE/ QUALITY CONTROL

In accordance with Appendix Q Construction Quality Assurance and Performance Standard Verification Plan of the Final Design Report, CRA completed QA/QC inspections of the RA construction activities. QA/QC activities consisted of reviewing of subcontractors' submittals for consistence with the Design Specifications, routine inspections, and testing of construction materials.

CRA analyzed samples of the imported common fill, rooting zone materials, topsoil and clay for chemical content and grain size in accordance with QA/QC requirements described in Section 02055 of the Design Specifications. CRA completed agronomic analysis of topsoil samples per Section 02055-2.3-A-5.

CRA reviewed the suppliers' specifications for the geotextile, seed mixture, fertilizer and mulch for the vegetated cover prior to installation to ensure that proposed material met the Design Specifications.

CRA collected samples of stone used for the PVT and Site access roads for chemical and grain size analysis. CRA observed the riprap and PVT installation to ensure compliance with the Design Specifications.

Laboratory analytical reports and data validation memoranda for QA/QC samples collected during remedial construction are provided in Appendix G. The QA/QC sample data confirmed that the materials imported to the Site met the specifications of the Final Design Report.

CRA reviewed QA/QC activities with USACE during their periodic Site inspections and addressed any concerns raised by USACE. CRA discussed QA/QC activities with USEPA, IDEM, and USACE during the monthly construction progress meetings held throughout the construction period. CRA maintained daily logs of Site activities and QA/QC activities completed, and submitted copies to USEPA, IDEM and USACE on a weekly basis. In accordance with Section XXV Retention of Records, CRA or Himco Site Trust will retain all of the QA documents (originals) as described in the CD.

As discussed with USEPA in the Pre-construction Meeting on April 5, 2011, CRA retained a third-party licensed survey to complete the QA/QC of the landfill soil cover thickness throughout the RA construction activities. CRA proposed improvements to Table 3.1 and Table 4.1 of the CQAP to consolidate QA surveying requirements. In a June 9, 2011 email, USEPA approved changes to Table 3.1 and Table 4.1 of the CQAP.

7.2.1 ANALYTICAL LABORATORY DETECTION LIMITS

CRA sampled imported common fill and rooting zone materials for QA in accordance with the Final Design Report. CRA submitted the soil samples to TestAmerica in North Canton, Ohio in accordance with the Quality Assurance Project Plan (QAPP). The laboratory reporting limits for five analytes (1,2-dibromoethane [EDB], 2,4,6-trichlorophenol, bis[2-Chloroethyl]ether, N-Nitrosodi-n-propylamine, and pentachlorophenol) were greater than the IDEM Residential Default Closure Levels (RDCLs). IDEM approved the analytical results for the common fill and rooting zone import materials by email on May 6, 2011. IDEM requested that the reporting limits for topsoil samples meet IDEM RISC levels.

For topsoil, CRA used USEPA Method 8151 for herbicide analysis to achieve a sufficiently low MDL (0.0043 mg/kg) for pentachlorophenol.

USEPA Method 8270 provided the lowest possible reporting limit for 2,4,6-Trichlorophenol, bis(2-Chloroethyl)ether and N-Nitrosodi-n-propylamine, but the

reporting limits were greater than the RDCLs. RISC Appendix 1, Default Closure Tables, Table A Residential Closure Levels, Note 5 states that bis(2-Chloroethyl)ether and N-Nitrosodi-n-propylamine may not have an analytical method available to meet the RISC closure limits. The RDCLs are based upon the lowest closure level available from all exposure pathways. For the five analytes in question, the RDCL is based on the groundwater migration pathway. Since IDEM verified that the exposure pathway of concern is direct contact, applicable closure levels are met by the analytical methods used by CRA. USEPA approved the proposed analytical methods and the topsoil data provided in a May 18, 2012 email.

7.3 COMMON FILL MATERIAL PLACEMENT

Clean imported fill material was placed on the waste material to regrade the landfill and provide a uniform surface for the rooting zone and topsoil material. The common fill reduced the yielding and rutting of the waste layer and supported the placement of the rooting zone layer.

7.4 ROOTING ZONE MATERIAL PLACEMENT

A minimum 12-inch layer of rooting zone soil was placed over the reshaped waste layer. The rooting zone layer provides protection to the underlying waste, supports the growth of vegetation, and retains water. The rooting zone soil imported to the Site met the Final Design Report requirements. The soil was classified as a sandy loam per United States Department of Agriculture (USDA) textural chart and met the soil grain size distribution requirements (i.e., soil contained less than 70 percent sand and at least 30 percent silt and clay). The soil was analyzed for TCL VOCs, TCL SVOCs, Pesticides, PCB, herbicides, TAL metals and cyanide. The grain size distribution and analytical data are provided in Appendix G.

Approximately 110,500 yd^3 of rooting zone soil was imported to the Site and placed on the landfill.

7.5 TOPSOIL MATERIAL PLACEMENT

The topsoil layer will support the growth of the vegetative layer, which is an integral component in maintaining the long-term effectiveness of the landfill cover. The vegetative layer will serve to:

1. Stabilize the soil against erosion from surface water runoff and wind
2. Maximize evapotranspiration of soil moisture
3. Increase the aesthetic value of the soil cover

A minimum 6 inch layer of topsoil was placed over the rooting zone layer to support vegetative growth. The topsoil consists of 6 inches of tilled, uncompacted soil. As described in the Final Design Report, QA/QC samples confirmed that the topsoil contained a maximum aggregate size of 1.5 inches, contained 3-percent to 20-percent organic matter, and had a pH of 6.1 to 7.8. Topsoil samples were also analyzed for the following agronomic parameters in accordance with the Design Specifications:

- Ammonium
- Cation exchange capacity
- Nitrate as NO_3
- Percent organic matter, calcium, hydrogen, magnesium, and potassium
- Phosphorus content

CRA confirmed through QA/QC samples that the topsoil imported to the Site met the minimum criteria for vegetative growth for each of these agronomic parameters as presented in Table 4.3 of the Final Design Report.

Approximately 61,000 yd^3 of topsoil was imported to the Site during remedial construction activities.

The topsoil layer will support the growth of the vegetative layer, which is an integral component in maintaining the long-term effectiveness of the landfill cover. The vegetative layer will serve to:

1. Stabilize the soil against erosion from surface water runoff and wind
2. Maximize evapotranspiration of soil moisture

3. Increase the aesthetic value of the soil cover

7.6 SEEDING

In accordance with the Final Design Report, CRA selected grass seed mixture which met the requirements set out by the USDA through the Indiana Soil Conservation Service (SCS). During the development of the 100% Final Design, CRA retained an ecological consultant, Cardno JFNew, to assist with soil and seed specifications and ensure the successful growth of the vegetative layering the soil cover. In response to June 2011 suggestions from the City of Elkhart that the landfill cover include native grasses, CRA consulted with both the Purdue SCS extension for Elkhart County and Cardno JFNew. Cardno JFNew recommended a native grass seed supplement, as summarized in Table 7.1, that would be used in addition to the seed mix specified in the Final Design Report.

In a September 14, 2011 meeting, the USACE approved adding the prairie seed mix as a supplement to the seed mix specified in the Final Design Report.

8.0 SURFACE WATER MANAGEMENT

In accordance with the Surface Water Management Plan (SWM Plan) in the Final Design Report, CRA constructed surface water conveyance controls (drainage swales, cover system stormwater diversion berms/swales, and culverts) to intercept and convey runoff to either the Quarry Pond, the L Pond, or the Little Pond. The surface water conveyance controls as constructed are shown on Drawing No. 7.

CRA prepared a SWPPP that detailed specific sediment and erosion control measures implemented at the Site during construction. The Elkhart County Soil and Water District issued a SWPPP permit to the Site on November 15, 2011 (see Appendix H).

9.0 PASSIVE VENTILATION TRENCH

CRA installed a PVT along the southern and southeastern boundaries of the landfill, as shown on Drawing No. 6. The alignment of the PVT was based on the limit of final cover, and was off-set from perimeter road in accordance with the RD.

The PVT construction details are shown on Drawing No. 10. Consistent with the Final Design Report, CRA constructed the PVT with approximately 1,200 linear ft of slotted 4-inch Schedule 40 polyvinyl chloride (PVC) piping within a trench filled with a porous gravel column. The trench is approximately 3 ft wide and the slotted pipe was placed approximately 2 ft above the water table (approximately 7 ft bgs at the time of installation in May 2012). This depth accounts for seasonal fluctuations in the groundwater elevations at the Site. CRA installed a geotextile separator over the gravel, and covered the geotextile with 6 inches of rooting zone soil and 6 inches of topsoil. The width of the porous gravel trench is such that there is at least one diameter width (4 inches) of space on each side of the lateral pipe to provide adequate support for the lateral piping.

Per the Final Design Report, CRA installed 4-inch PVC riser pipes in the PVT every 100 ft. The risers extend from the slotted PVC pipe to a height of approximately 9 ft above the finished ground surface. CRA installed 4-inch diameter wind turbines at the top of each riser. CRA constructed in-ground vaults adjacent to each riser pipe to provide access to ¼-inch sampling ports and the riser to measure depth to water.

9.1 SOIL GAS PROBES ABANDONMENT AND INSTALLATION

In accordance with the Final Design Report, CRA installed 15 permanent soil gas probes (SGP-100 through SGP-114) along the southern and southeastern boundaries of the Site. The soil gas probe locations are shown on Drawing No. 6. CRA installed the soil gas probes approximately 200 ft apart. Soil gas probe construction details are shown on Drawing No. 10. Cross-sections of soil gas probes SGP-100 through SGP-104 are shown on Drawings No. 14 and 15.

The riser pipes for the soil gas probes consist of ½-inch diameter Schedule 40 PVC continuous piping (with no joints). CRA installed the riser pipes at varying depths based on the observed groundwater elevation encountered at the time of installation.

The soil gas probe installation depth and lengths of perforated and solid piping are summarized on Drawing No. 10 and installation logs are provided in Appendix I. At each location, CRA installed the soil gas probes at least 1 foot above the local groundwater table observed during the installation.

CRA installed each soil gas probe in 3/8-inch-diameter clear stone to approximately 1 foot above the top of the screened interval, and used hydrated bentonite to seal the rest of the borehole up to ground surface. CRA completed the soil gas probes with a concrete surface seal and a protective casing fitted with bolts and a lock.

In accordance with the Final Design Report, CRA abandoned eight existing soil gas probes (SGP-6, SGP-7, SGP-8, SGP-9, SGP-17, SGP-18, SGP-22, and SGP-24) to facilitate construction of the soil cover for the landfill. The soil gas probes were abandoned in accordance with the IDNR 312 IAC 13, Rule 10. The abandoned soil gas probes are shown on Drawing No. 4, and abandonment logs at provided in Appendix I.

10.0 ANCILLARY FEATURES

CRA constructed the Site access road in accordance with the Final Design Report specifications except for the portion of the road along the southern Site perimeter. As discussed with the USEPA during the September 14, 2011 Construction Progress Meeting, CRA modified the Site access road along the south portion of the Site. The access road elevation and location was modified from the RD to provide storm water runoff relief to the residential properties south of the Site. The drainage swale on the north side of the access road was widened by adjusting the side slopes from 3H:1V and adjusting the final cover from 4H:1V to 2H:1V in order to effectively convey a 24-hour, 25-year storm event.

11.0 MEETINGS AND INSPECTIONS

11.1 PRE-CONSTRUCTION INSPECTION

In accordance with Section III, Task 4 of the SOW and Section 9.3 if the RAWP, the PSDs held a pre-construction meeting and inspection at the Site on April 5, 2011. USEPA, IDEM, USACE, Himco Site Trust and CRA attended the meeting and Site inspection. The topics discussed during the meeting included lines of authority and communication, documentation and reporting of inspection data, methods for distributing and storing record documents, health and safety and Site security, CQAP modifications, progress schedules and progress meetings, and USEPA public relation responsibilities. The attendees reviewed the scope of work and walked the Site after the meeting.

11.2 MONTHLY PROGRESS MEETINGS

CRA hosted monthly progress meetings at the Site to present construction progress updates, discuss construction QA/QC issues, discuss the schedule, and review technical items requiring USEPA approval. CRA prepared meeting minutes and distributed to the meeting participants, which included USEPA, IDEM, USACE, Himco Site Trust and CRA. CRA provided an updated construction schedule to USEPA and IDEM during these monthly meetings. At USEPA and USACE's request, CRA also distributed CQAP reports by email each week to keep the Agencies apprised of progress and routine inspection results.

11.3 PRE-FINAL CONSTRUCTION INSPECTION

In accordance with Section III, Item 4.2 of the SOW, the PSDs hosted the Pre-Final Construction Inspection at the Site on June 14, 2012. Per the SOW, USEPA, IDEM, Himco Site Trust and CRA completed a walk-through inspection of the Site and reviewed the components of the constructed RA. CRA documented the outstanding items identified during the inspection.

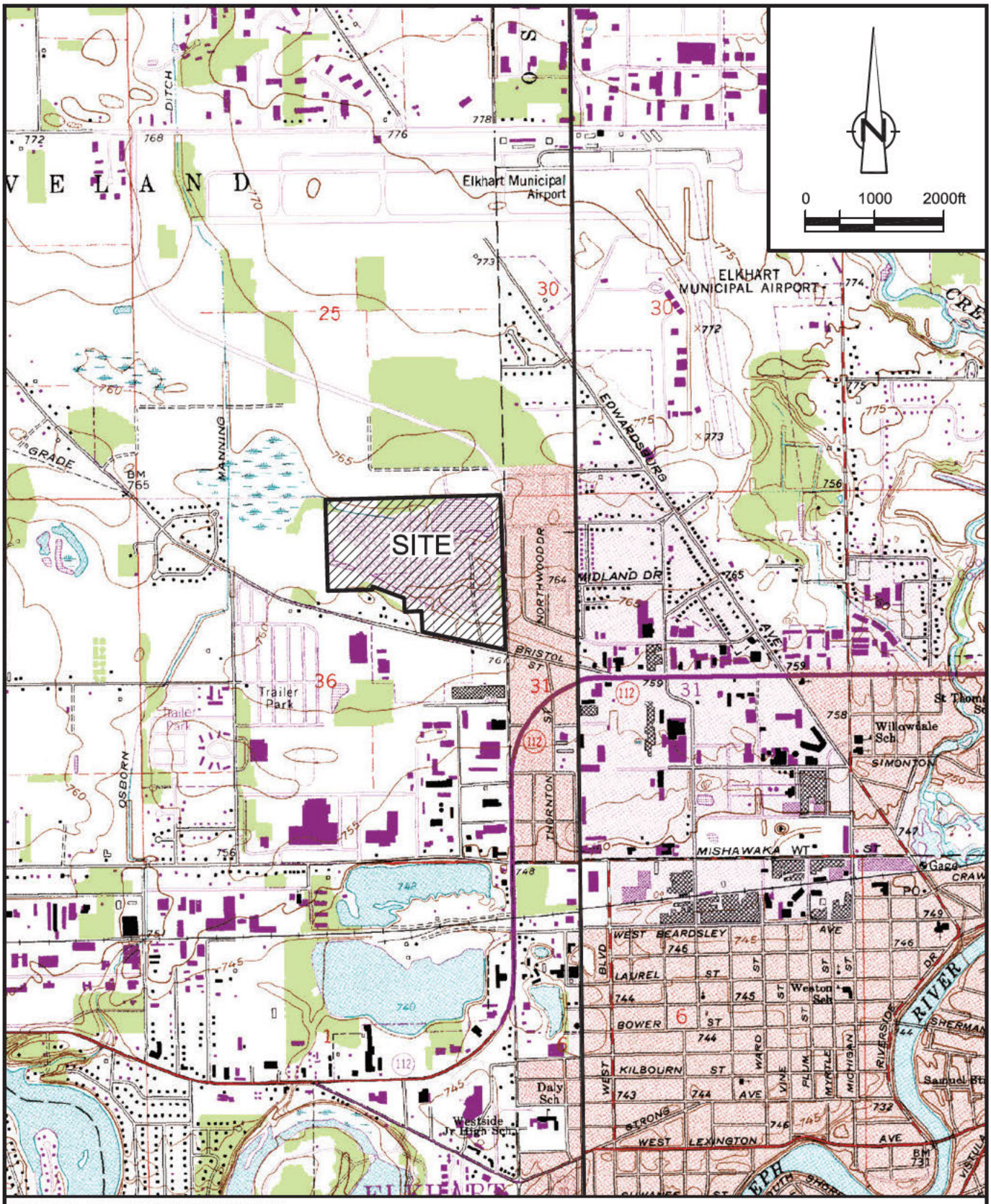
Per Section III Task 4, Item 4.3 of the SOW, the PSDs submitted draft meeting minutes to USEPA on June 19, 2012 via email. The meeting minutes included a punch list of items to be addressed, as identified during the Pre-final Construction Inspection. USEPA issued a letter on June 21, 2012 that documented USEPA's concurrence with the punch list prepared by CRA. On June 29, 2012, CRA submitted a Pre-final Construction

Inspection Report that formalized the punch list, documented that the punch list items had been addressed, and provided photographs of the completed improvements. The Pre-final Construction Inspection Report is provided in Appendix J. On behalf of the PSDs, CRA proposed in the June 29, 2012 letter that the Construction Completion Report be due 30 days after USEPA approved the Pre-Final Construction Inspection Report. USEPA approved the Pre-final Construction Inspection Report on July 16, 2012 and concluded that a Final Construction Inspection was not required.

12.0 OPERATION AND MAINTENANCE

In accordance with Section III, Task 5, of the SOW, the PSDs hand-delivered the Final Operation and Maintenance (O&M) Plan to USEPA on June 14, 2012. The Final O&M Plan documents the scope of the inspections and anticipated maintenance required to maintain the RA.

In accordance with the O&M Plan, the PSDs will commence quarterly O&M inspections of the Site in 2012. The first inspection is scheduled for September 2012.

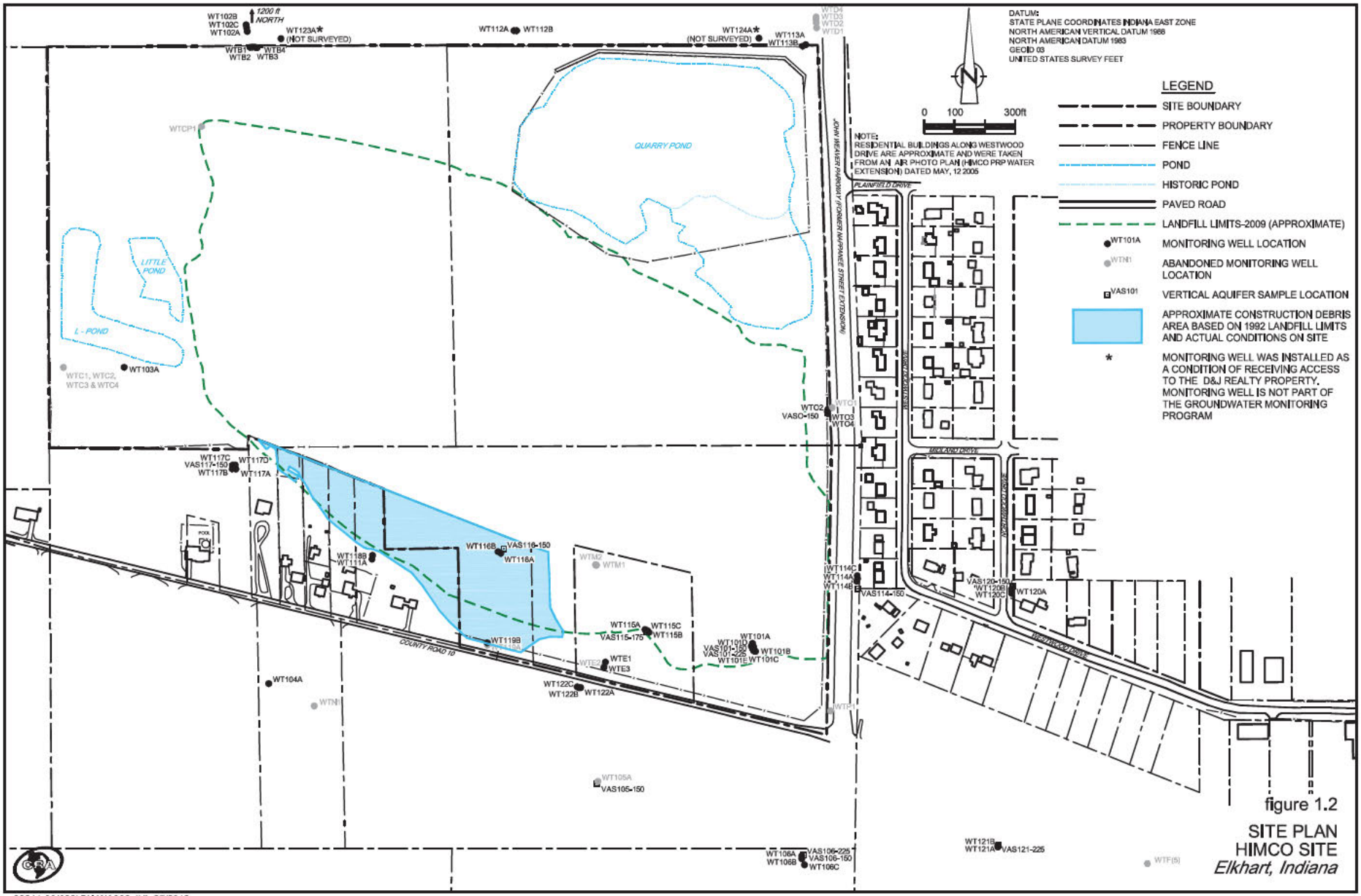


SOURCE: USGS QUADRANGLE MAPS;
ELKHART AND OSCEOLA, INDIANA

figure 1.1

SITE LOCATION MAP
HIMCO SITE
Elkhart, Indiana

39611-00(033)GN-WA001 JUL 18/2012


DATUM:
STATE PLANE COORDINATES INDIANA EAST ZONE
NORTH AMERICAN VERTICAL DATUM 1988
NORTH AMERICAN DATUM 1983
GEOID 03
UNITED STATES SURVEY FEET
LEGEND
SITE BOUNDARY
PROPERTY BOUNDARY
FENCE LINE
POND
HISTORIC POND
PAVED ROAD
LANDFILL LIMITS-2009 (APPROXIMATE)
MONITORING WELL LOCATION
ABANDONED MONITORING WELL LOCATION
VERTICAL AQUIFER SAMPLE LOCATION
APPROXIMATE CONSTRUCTION DEBRIS AREA BASED ON 1992 LANDFILL LIMITS AND ACTUAL CONDITIONS ON SITE
MONITORING WELL WAS INSTALLED AS A CONDITION OF RECEIVING ACCESS TO THE D&J REALTY PROPERTY. MONITORING WELL IS NOT PART OF THE GROUNDWATER MONITORING PROGRAM
NOTE:
RESIDENTIAL BUILDINGS ALONG WESTWOOD DRIVE ARE APPROXIMATE AND WERE TAKEN FROM AN AIR PHOTO PLAN (HIMCO PRP WATER EXTENSION) DATED MAY, 12 2005
0 100 300ft
N
QUARRY POND
LITTLE POND
L - POND
JOHN WEAVER PARKWAY (FORMER MAPLE STREET EXTENSION)
PLAINFIELD DRIVE
WESTWOOD DRIVE
NORTHWOOD AVENUE
COUNTY ROAD 19
WT102B
WT102C
WT102A
1200 ft NORTH
WT123A*
(NOT SURVEYED)
WTB1
WTB2
WTB4
WTB3
WT112A
WT112B
WT124A*
(NOT SURVEYED)
WT113A
WT113B
WTD4
WTD3
WTD2
WTD1
WTCP1
WT103A
WTC1, WTC2, WTC3 & WTC4
WTC2
VAS0-150
WTC3
WTC4
WT117C
VAS117-150
WT117B
WT117D
WT117A
WT116B
VAS116-150
WT116A
WT118B
WT111A
WTM2
WTM1
WT114C
WT114A
WT114B
VAS114-150
VAS120-150
WT120B
WT120C
WT120A
WT115A
VAS115-175
WT115C
WT115B
WT119B
WT119A
WT101A
WT101D
VAS101-150
VAS101-225
WT101E
WT101B
WT101C
WTE2
WTE1
WTE3
WT104A
WTN1
WT122C
WT122B
WT122A
WTH1
WT105A
VAS105-150
WT106A
WT106B
VAS106-225
VAS106-150
WT106C
WT121B
WT121A
VAS121-225
WTF(5)
figure 1.2
SITE PLAN
HIMCO SITE
Elkhart, Indiana
CRA
39611-00(033)GN-WA002 JUL 27/2012

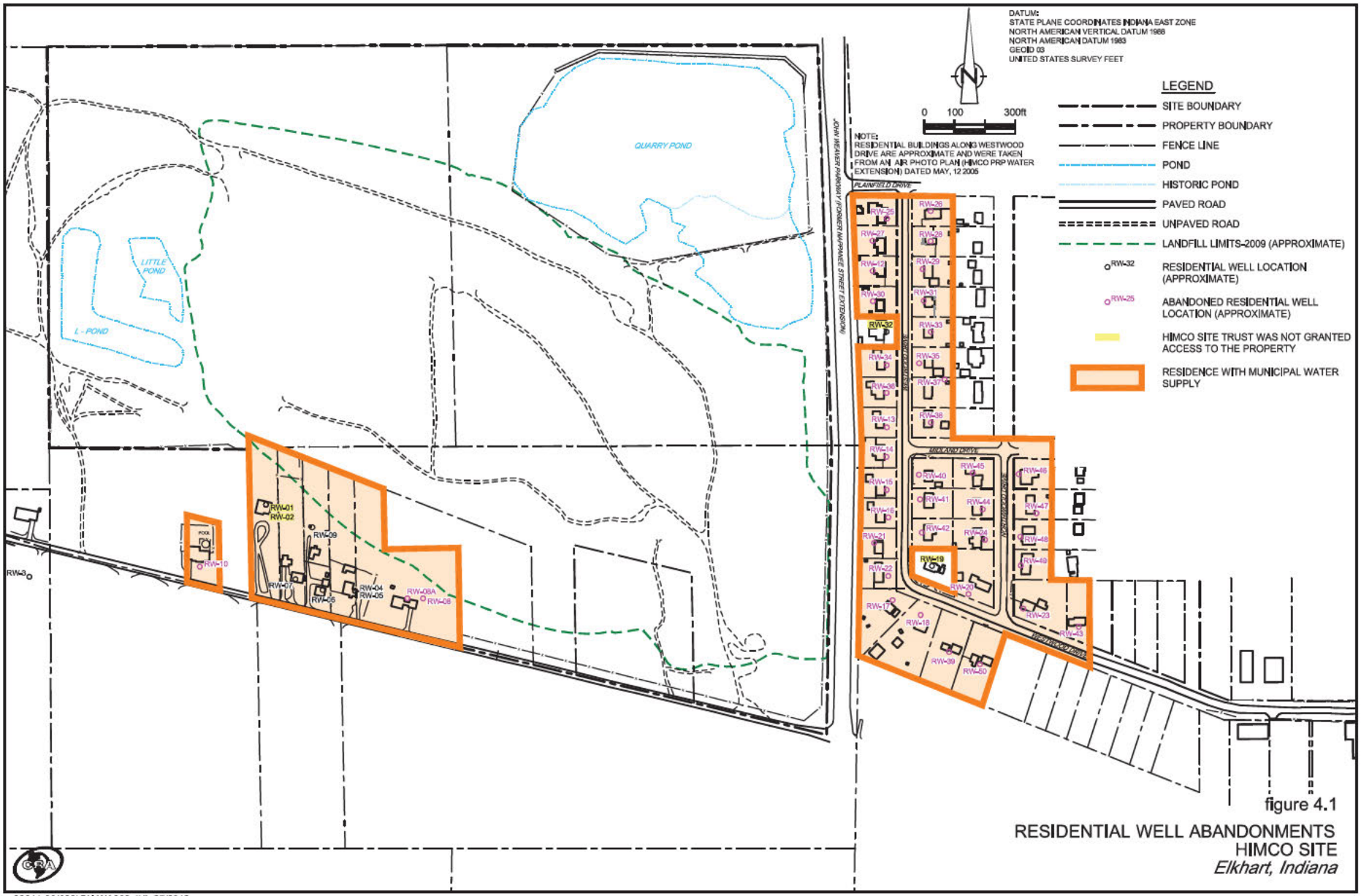


figure 4.1

RESIDENTIAL WELL ABANDONMENTS
HIMCO SITE
Elkhart, Indiana

39611-00(033)GN-WA003 JUL 27/2012

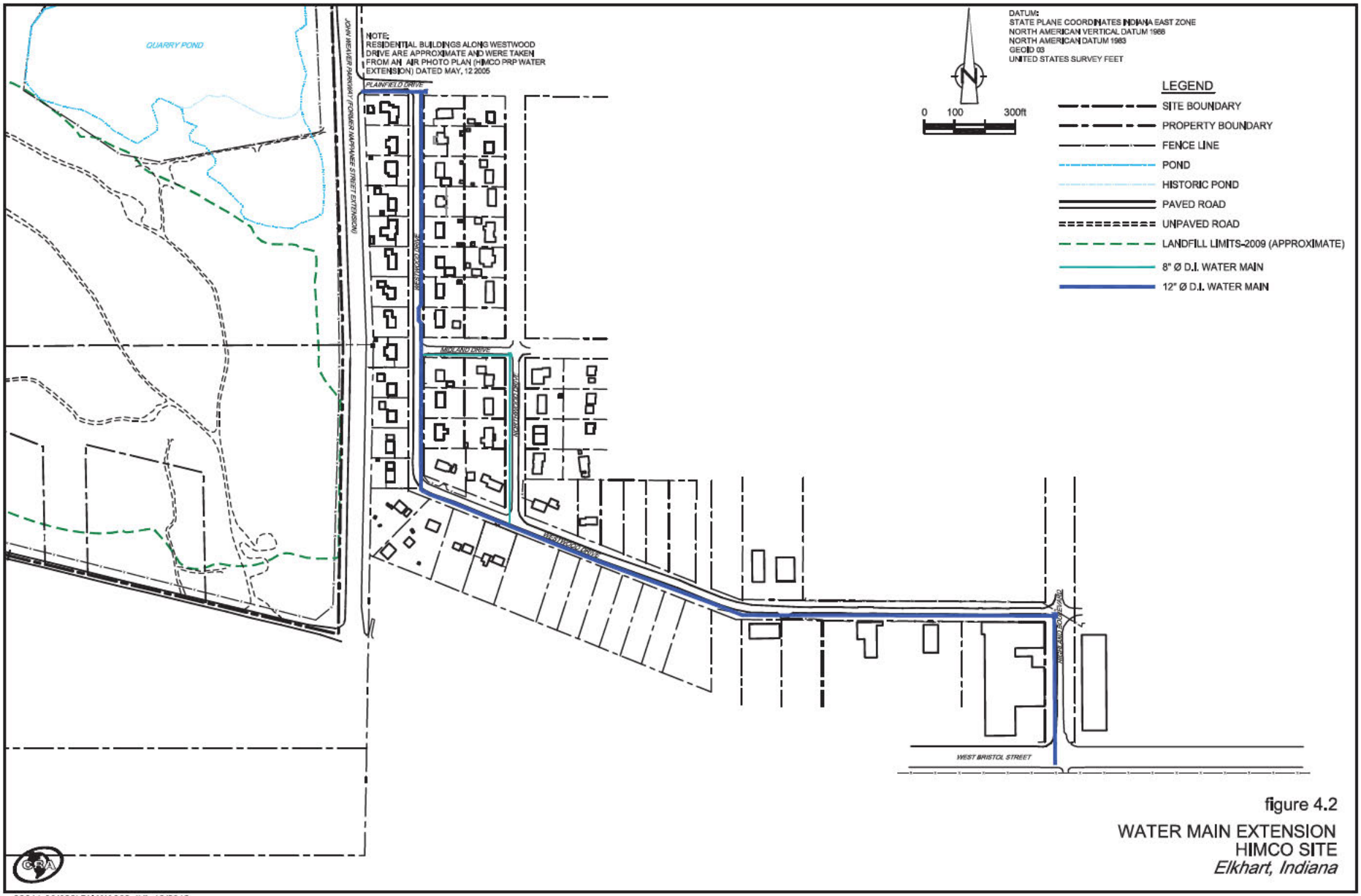


figure 4.2

WATER MAIN EXTENSION
HIMCO SITE
Elkhart, Indiana

39611-00(033)GN-WA003 JUL 19/2012

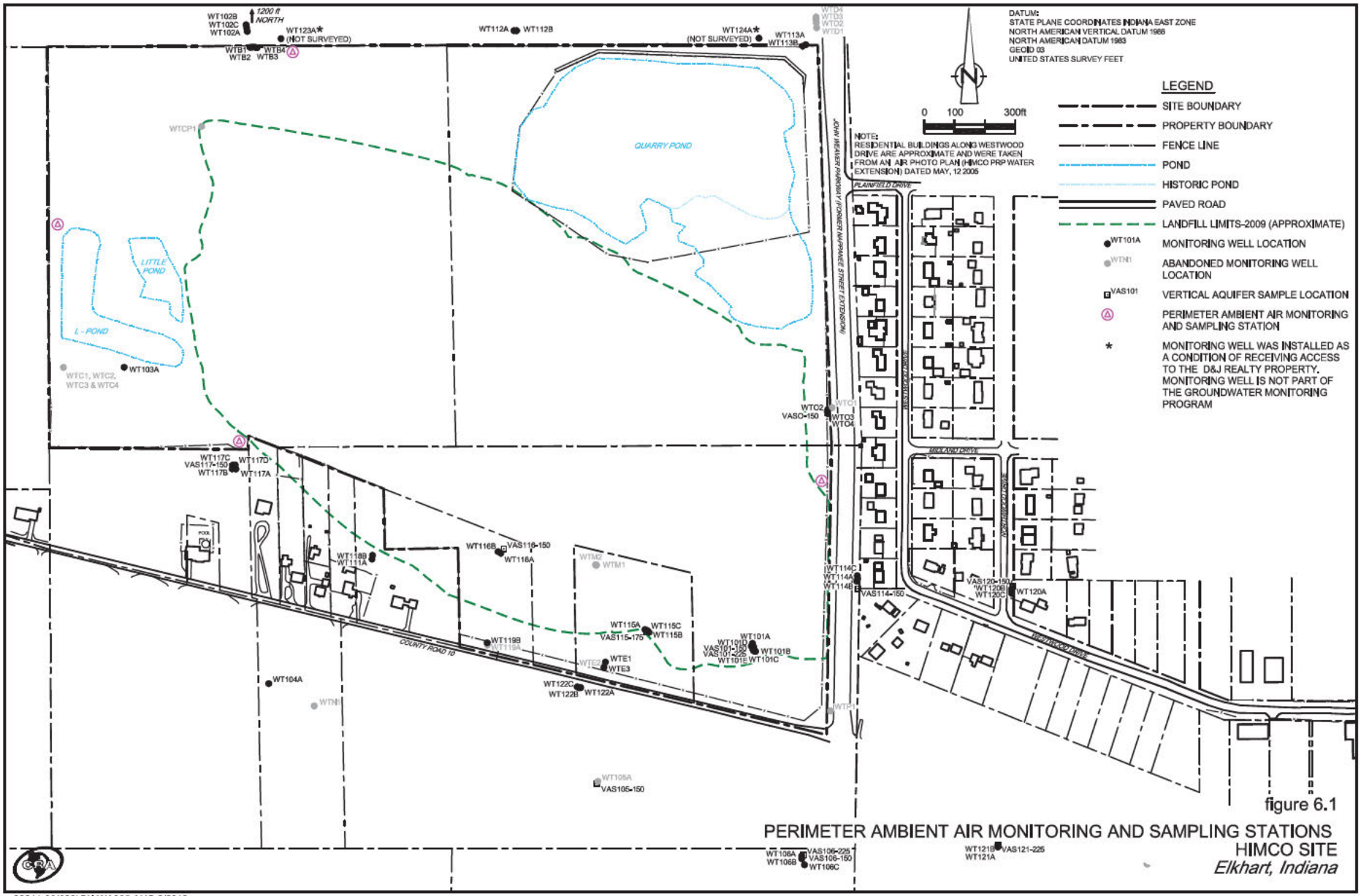


figure 6.1

PERIMETER AMBIENT AIR MONITORING AND SAMPLING STATIONS
HIMCO SITE
Elkhart, Indiana

39611-00(033)GN-WA005 AUG 2/2012

Appendix B – USEPA Conditional Approval Letter

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

SEP 13 2012

SR-6J

Mr. Gary Toczylowski
Bayer HealthCare
Bayer Diabetes Care
555 White Plains Road
Tarrytown, New York 10591

Re: Himco Dump Superfund Site, Elkhart, Indiana Consent Decree No. 2:07-cv-304-TS
Construction Completion Report/Completion of Remedial Action Report

Dear Mr. Toczylowski:

The U.S. Environmental Protection Agency, with assistance from the Indiana Department of Environmental Management (IDEM), has reviewed the subject report, dated August 14, 2012. In accordance with Section XI, Paragraph 37(c) of the Consent Decree, the subject report is approved with the following modifications:

- Front cover – Please insert a date in the front cover.
- Page 25, paragraph 7.4 Rooting Zone Material Placement. It is stated that the grain size distribution and analytical data for the rooting zone material is presented in Appendix G. This could not be located. Please indicate where this information is found in the report.
- Page 26, paragraph 7.5 Topsoil Material Placement. Please describe and place the QA/QC results of topsoil samples in Appendix G.
- Figure 4.1: Residential wells RW4 through RW9 in the homes located in the CDA are depicted in this figure as not being abandoned. Based on previous conversations between EPA and CRA, it was our understanding that some residential wells in the homes located in the CDA could not be found. To clarify the situation with these wells, please indicate in Figure 4.1 whether these wells could not be found, and therefore, were not abandoned. If it helps, another legend explaining the situation with these wells could be inserted in the figure.
- Table 4.1 does not list the residential well designations shown on Figure 4.1. Please add a column for these designations.

As part of the revised report, please include a CD copy that includes the report, along with the appendices.

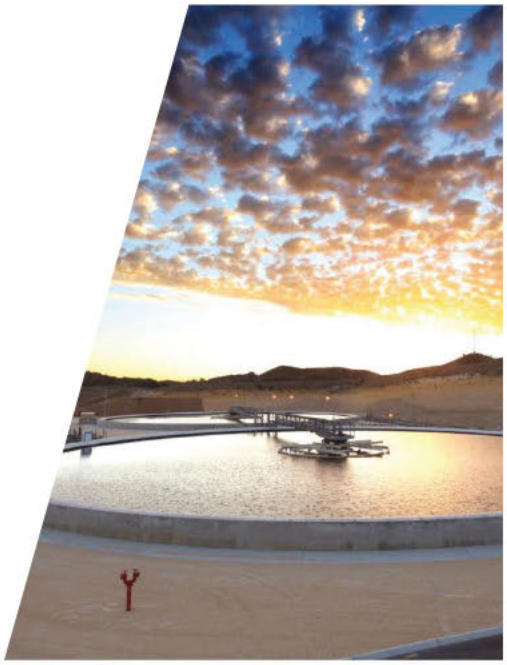
Your prompt attention on this matter is appreciated. If you have any questions on this matter, please contact Mr. Ross del Rosario of my staff at (312) 886-6195.

Sincerely,

Thomas R. Short, Jr., Chief
Remedial Response Branch 2

Cc: Larry Johnson, ORC
Doug Petroff, IDEM

Appendix C – Private Well Sampling Report



Private Well Sampling Report

Himco Site
Elkhart, Indiana

Bayer HealthCare LLC

October 1, 2018 Reference No. 039611

Mr. Rosauro del Rosario
EPA Project Manager/Coordinator
United States Environmental Protection Agency (USEPA) Region 5
77 West Jackson Boulevard
Chicago, Illinois
60604

Dear Mr. del Rosario:

Re: Private Well Sampling Report
Himco Site, Elkhart, Indiana (Site)

Please find attached the Private Well Sampling Report for the Himco Site. GHD has prepared this submittal on behalf of the Himco Site Trust for your approval. An electronic copy of the report is also provided for your use.

Should you have any questions, please contact me at (248) 893-3411.

Sincerely,

GHD

Douglas M. Gatrell, P.E. Alan Deal

AD/ks/74

Encl.

cc: Doug Petroff, IDEM
Michelle Lordemann, USACE
Scott Krall, Bayer
Matthew Myers, Bayer

GHD
455 Phillip St Waterloo Ontario N2L 3X2 Canada
T 519 884 0510 **F** 519 884 0525 **W** www.ghd.com

Table [redacted]

Figure Index

Table Index

Appendix Index

1. [redacted]

1.1 Purpose

This report presents the results from groundwater samples collected from private wells located near the former Himco Dump Site (Site) in Elkhart, Indiana. GHD has prepared this report on behalf of the Performing Settling Defendants (PSDs), collectively known as the Himco Site Trust. The results from this sample collection and analysis will be used to determine if these private wells have been impacted by arsenic dissolved in groundwater.

1.2 Background

The Site is a closed landfill located at the intersection of [redacted] in Cleveland Township, Elkhart County, Indiana. The Site is approximately 60 acres in size, and accepted waste such as household refuse, construction rubble, medical waste, and calcium sulfate between 1960 and 1976. The landfill was closed in 1976.

The Site was proposed for the National Priorities List (NPL) in 1988 and was placed on the NPL in 1990. The Himco Site is being remediated pursuant to a Consent Decree (Civil Action No. 2:07cv304 (TS)) (CD). The Statement of Work (SOW), included as Appendix B of the CD, specified the Remedial Action (RA) requirements for the Site. The Remedial Design/Remedial Action (RD/RA) is being conducted pursuant to the CD, which became effective on November 27, 2007.

Figure 1.1 shows the Site location. **Figure 1.2** shows the layout of the Site, including property boundaries. The Site consists of two major areas: the landfill, and the 4-acre construction debris area (CDA). The CDA is located on the northern portion of seven residential properties and one commercial property that front onto [redacted]. In 2011, the PSDs relocated CDA waste to the landfill, and completed the construction of a soil cover over the landfill in 2012. United States Environmental Protection Agency (USEPA) approved the Construction Completion Report/Completion of Remedial Action Report (CRA, 2012) on October 31, 2012.

The SOW required groundwater investigations to the east and southeast of the Site and the implementation of a Groundwater Monitoring Program (GMP). GHD completed quarterly groundwater monitoring between 2008 and 2011. In accordance with the Interim Groundwater Monitoring Program Report (CRA, 2011), approved by USEPA on August 31, 2011, the GMP currently includes semi-annual groundwater monitoring with annual reporting each fall.

Groundwater samples from several monitoring wells routinely contain arsenic at concentrations greater than the Groundwater Remedial Action Objective (GW RAO) of 10 micrograms per liter (µg/L). **Figure 1.3** shows arsenic data collected from the Intermediate Aquifer monitoring wells in September 2017 and April 2018.

On September 8, 2015 GHD canvassed residences and businesses in the vicinity to determine the source of drinking water at the property (i.e., municipal water or private well) and to determine if there is a potential for the private wells to intercept the Intermediate Aquifer arsenic plume. The Himco Site Trust provided the results on the door to door survey to USEPA in a letter from GHD dated November 2, 2015.

[redacted]Trust, submitted the Private Well Sampling Work Plan to EPA on April 25, 2018 for an additional sampling effort. USEPA approved the work plan on May 29, 2018.

2. Field Activities

2.1 Obtaining Consent to Sample

Prior to sampling the private wells the Himco Site Trust obtained permission from the property owners to collect groundwater samples from their wells. Initially, Kazmarek Mowrey Cloud Laseter LLP, on behalf of the Himco Site Trust, contacted residents via certified mail requesting consent to collect a groundwater sample from their private wells. Permission was initially received from five owners via signed copies of the "Consent to Well Sampling Event". Beginning on July 25, 2018, GHD began a door to door survey to contact the non-responsive owners and to collect samples where consent was granted.

Figure 2.1 shows the area canvassed in the 2018 door to door survey, the limits of the Intermediate Aquifer arsenic plume, the properties supplied by municipal water, the properties with private wells and the approximate location of these private wells. Based on the results of the 2018 door to door survey, private wells were confirmed to supply water to 11 properties.

The civic address of the properties where GHD has identified and confirmed private wells in 2018 are as follows:

[redacted]

Seven properties were identified to have municipal water in lieu of private wells:

[redacted]

[1] The water supply at 1402 Bristol is connected to the well on 1400 Bristol Street.

[redacted]

Six properties confirmed to not have a well on their property:

[redacted]

- 1444 Bristol - the former commercial building (Coffee & More) has been demolished and the property manager informed GHD in August 2018 that there is no well present on the property and there are currently no plans to develop the property.
- 1500 Bristol - (Former Fidler, Inc.) is also owned by the owner of 1444 Bristol. The property manager confirmed in August 2018 that there was no private well on the property.

2.2 Private Well Sampling Methods

GHD conducted field activities in accordance with the applicable protocols described in the Field Sampling Plan (FSP) (CRA, October 2008). Similar field procedures are used in private well sampling as are used in monitoring well sampling (including documentation, sample identification, date, time, etc.) however a different well purging protocol is required. Prior to collection of groundwater samples from a private well, the well must be purged to ensure that samples are representative of the formation and not influenced by the standing water in the plumbing system. Purging removes standing water from the well casing, pipes, and pressure or holding tank. Sampling of private wells utilized the existing plumbing system.

Taps selected for private well sampling were located as close to the well as possible with a preference for taps located upstream of any treatment systems and, if possible, the pressure tank.

The private well purging and sampling protocol was as follows:

1. Aerators, strainers, and hose attachments were removed prior to sampling, if possible.
2. If there is no sink or drain suitable for collecting purge water a hose was attached to the tap so that purge water could be directed to a suitable location.
3. The cold water tap was opened for a period of 15 to 30 minutes (maximum) to allow for the complete purging of the pumping system.
4. A smooth-flaring water stream was maintained at a low to moderate pressure and flow without splashing. The flow rate was not changed. The well and plumbing system was not stressed during sampling and flow was maintained at a sustainable rate.
5. GHD recorded field measurements of pH, conductivity, and temperature of the purge water every 5 minutes until the readings indicated that stabilization occurred or until 30 minutes has elapsed, whichever occurred first. The stabilization parameters are provided in **Appendix A**.
6. Stabilization was achieved when three consecutive readings for temperature and conductivity are within 10 percent of the average of the readings and pH measurements were within 1 unit of the average of the readings.

[redacted]e gloves was donned at each sampling location prior to sampling.

8. The laboratory-supplied sample bottle was filled directly from the tap.
9. One blind field duplicate sample was collected for each ten investigative samples submitted. The investigative sample bottle and the field duplicate bottle were filled by alternating between the two bottles with a one third aliquot into each until both bottles were filled.
10. Samples were handled as described in the FSP (CRA, October 2008).

GHD shipped the groundwater samples to TestAmerica Laboratories Inc. of North Canton, Ohio for arsenic analysis. Laboratory reports and data validation memoranda are provided in **Appendix B**. GHD validated the groundwater analytical data in accordance with the Quality Assurance Project Plan (QAPP) included in the RD Work Plan (CRA, November 2008).

3. Sample Results

3.1 Private Well Sample Results

GHD sampled nine private wells on July 25 through 27, 2018. On August 22, 2018 and September 12, 2018, GHD returned to the area and sampled the private wells at [redacted] and [redacted], respectively. The results of the arsenic analysis of the private well samples were as follows:

Table 3.1 2018 Private Well Sampling Results

Address	Date	Arsenic Concentration (µg/L)
[redacted]	7/25/2018	7.5
	7/27/2018	7.8
	7/26/2018	1.0 U
	7/27/2018	1.0 U
	9/12/2018	0.31 J
	7/26/2018	1.0 U
	7/27/2018	5.3
	7/27/2018	2.0
	8/22/2018	1.0 U
	7/26/2018	2.0/2.6 (D)
	7/27/2018	***19***

Notes:

19 Bold italic font indicates the arsenic concentration is greater than the GWRAO of 10 µg/L.
(D) Duplicate sample.
U Not detected at the associated detection limit.
J Estimated concentration.
(1) There was no available access to the water supply system upstream of the water softeners. Samples were collected from downstream of the water softeners.

[redacted]nt via certified mail to each property owner with a brief summary cover letter and their corresponding laboratory results package. See **Appendix B**.

The results from the private well samples collected in 2018 were all less than the GWRAO with the exception of the sample collected from 1241 North Nappanee Street. This property is currently an auto sales lot consisting of a large parking lot, a sales trailer, and a connected garage and storage building, which contains a bathroom supplied by a private well. In the letter to the property owner reporting the sample result, Bayer HealthCare LLC (Bayer) advised the property owner of the following:

"Bayer understands the primary uses for the well water are currently handwashing and sewage. Those uses may continue at this time. Bayer further understands that drinking water for the property is supplied by a bottled water dispenser. Bayer advises this practice continue as the property's sole drinking water source. Bayer will report this result to the USEPA, which may require further actions be taken. In the meantime, Bayer advises that you not use any water obtained from that well for drinking, cooking or other potable purposes."

4. Conclusions and Recommendations

4.1 Conclusions

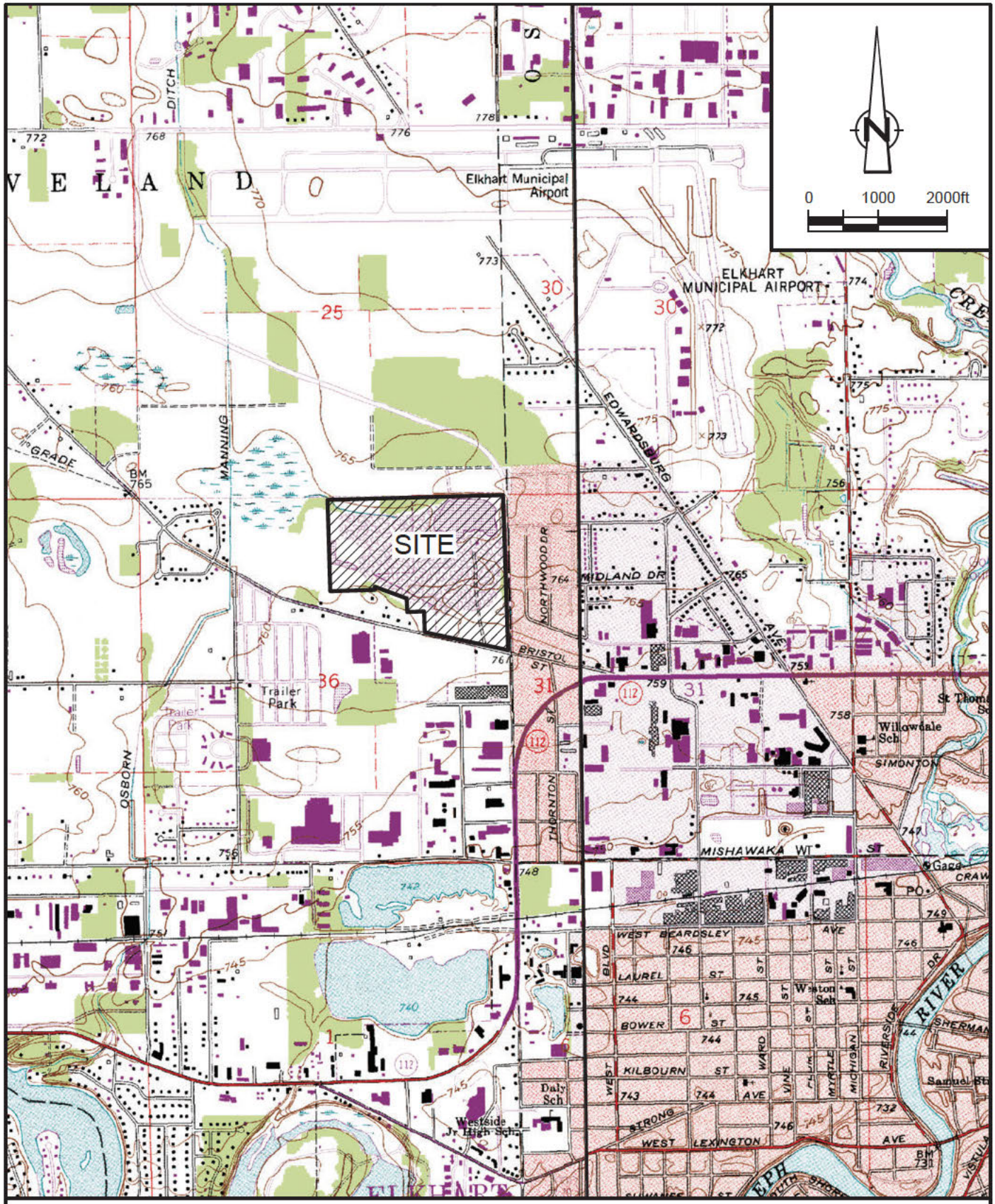
In 2018, GHD completed a door to door survey to determine if residences and businesses in the vicinity of the Intermediate Aquifer arsenic plume are supplied with municipal water or private wells.

GHD verified that 11 properties have a private water well, seven were supplied with municipal water and confirmed that six other properties had no private water well (but the municipal water supply was not confirmed).

GHD collected samples from the private wells and submitted them for arsenic analysis. The results from the private well samples collected in 2018 were all less than the GWRAO of 10 µg/L with the exception of the sample collected from 1241 North Nappanee Street.

4.2 Recommendations

Bayer will begin coordination efforts with the property owner of 1241 North Nappanee Street and fund the connection effort of the property to the available public water supply at this property in conjunction with the required abandonment of the existing well on the property in compliance with 312 Indiana Administrative Code (IAC) 13-10-2.



SOURCE: USGS QUADRANGLE MAPS;
ELKHART AND OSCEOLA, INDIANA

figure 1.1

SITE LOCATION MAP
HIMCO SITE
Elkhart, Indiana

GHD

39611-00(045)GN-WA003 SEP 19, 2018

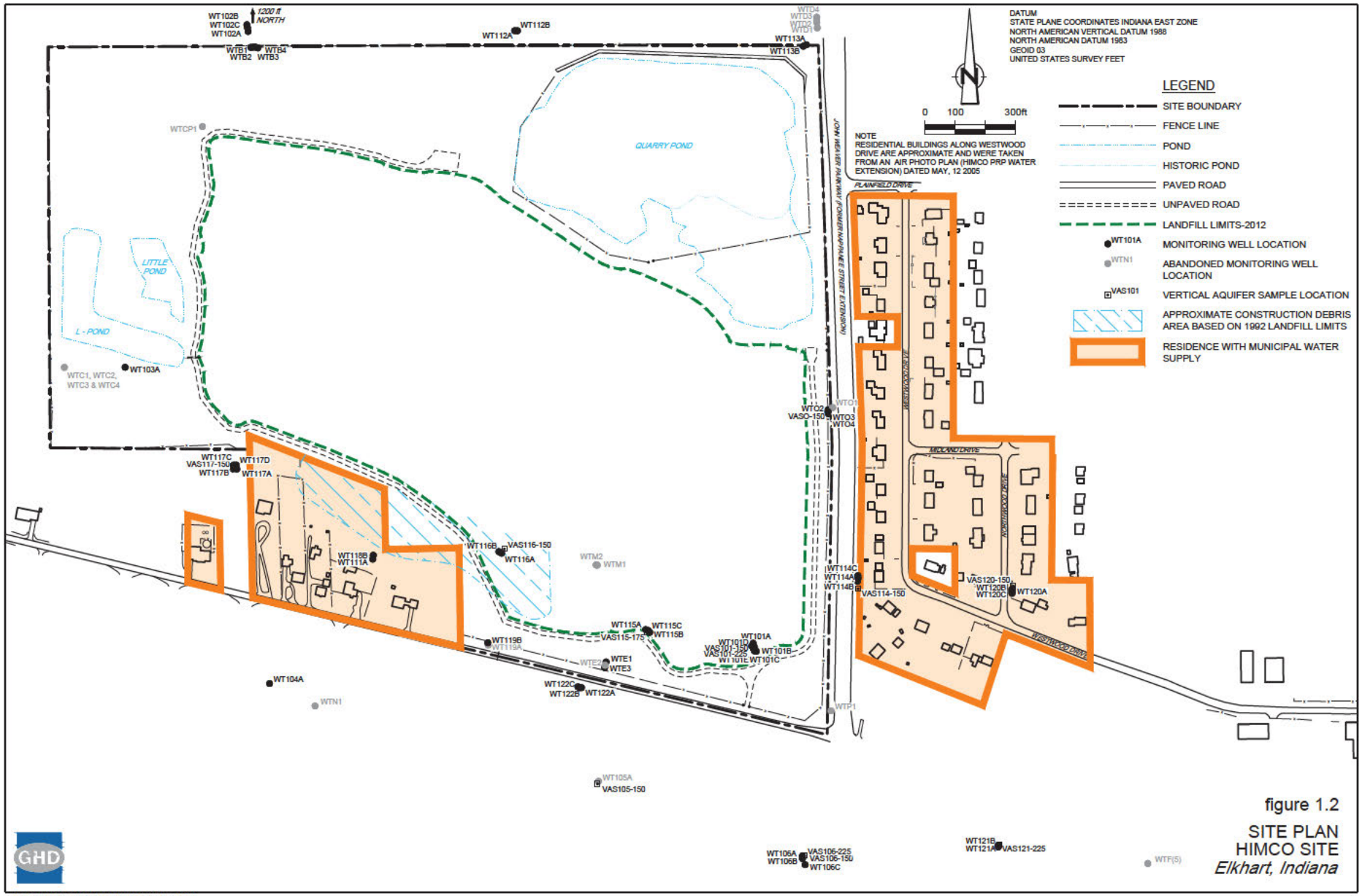


figure 1.2

SITE PLAN
HIMCO SITE
Elkhart, Indiana

GHD

39611-00(045)GN-WA002 SEP 19, 2018

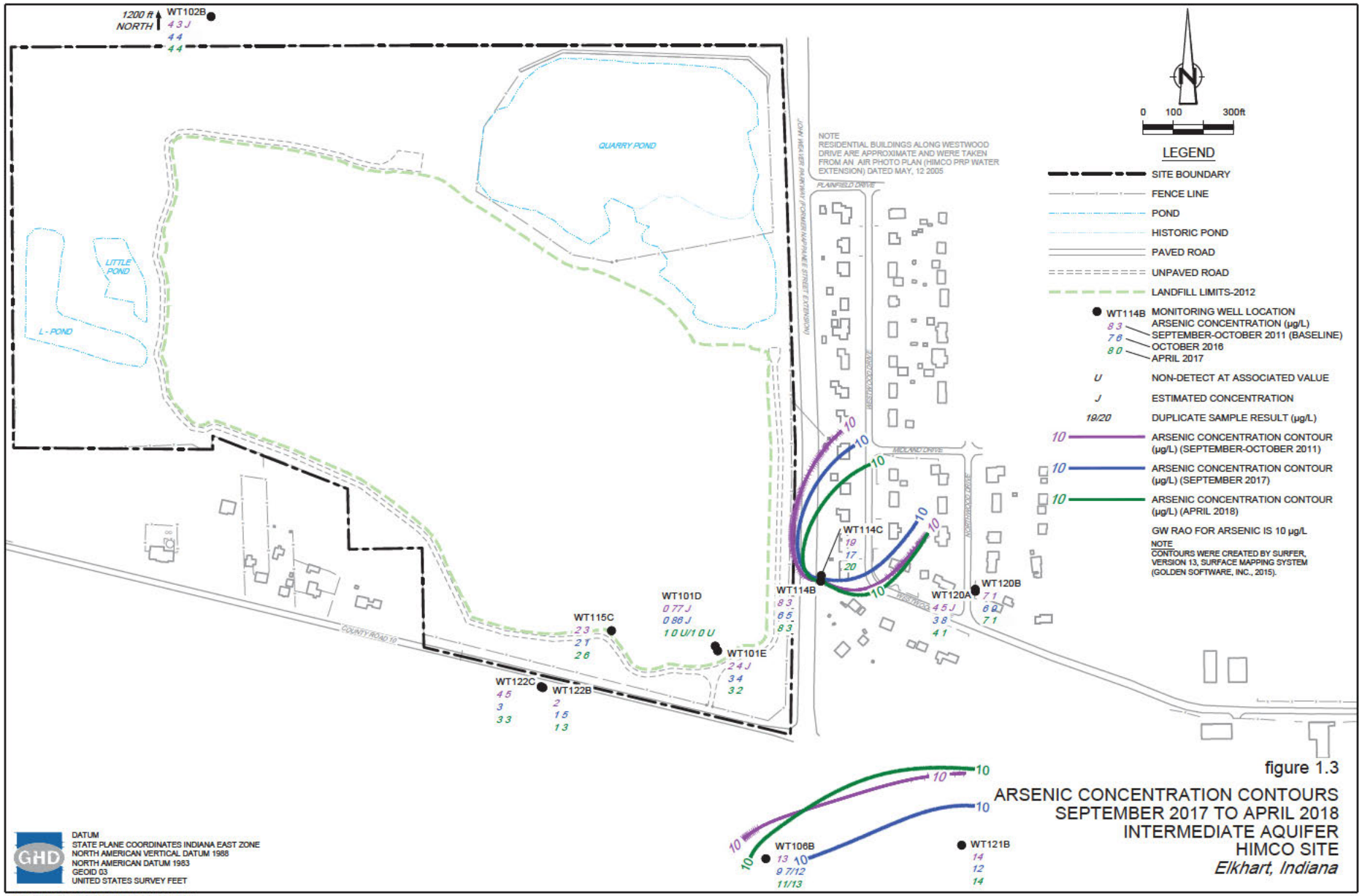
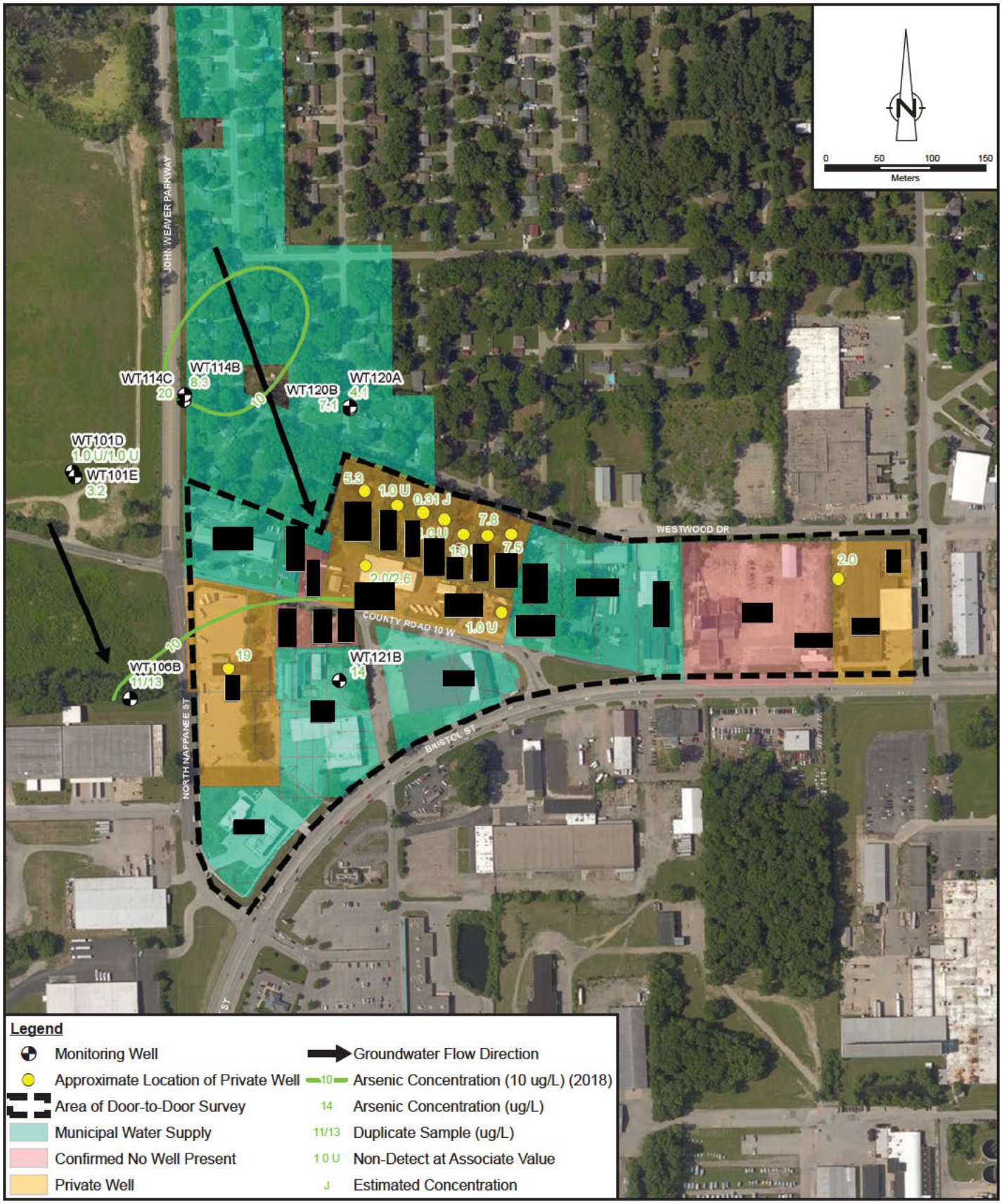


figure 1.3

ARSENIC CONCENTRATION CONTOURS
SEPTEMBER 2017 TO APRIL 2018
INTERMEDIATE AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(045)GN-WA001 SEP 6, 2018



Source: Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation, Acquisition Date July 4, 2015, accessed 2018; Wells : Indiana Department of Natural Resources, Parcels: Indiana Department of Homeland Security (IDHS); Coordinate System: NAD 1983 UTM Zone 16N

HIMCO SITE
ELKHART, INDIANA

039611-00
Sep 27, 2018

PRIVATE WELL SAMPLING RESULTS

FIGURE 2.1

GIS File: Q:\GIS\PROJECTS\39000s\39611\Layouts\045\039611-00(045)GIS-OT001.mxd

Appendix D - Conditional Approval Letter for the Initial Site LTS Plan

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

April 3, 2019

Matthew J. Myers, CHMM, QEP
Manager, HSE Environmental Compliance
Bayer U.S. LLC
100 Bayer Road
Pittsburgh PA 15205

Re: Institutional Controls Implementation and Assurance Plan/Long-term Stewardship (LTS) Plan

Dear Mr. Myers:

The United States Environmental Protection Agency (EPA), assisted by the Indiana Department of Environmental Management (IDEM), has completed review of the Bayer's Institutional Controls Implementation and Assurance Plan (ICIAP), which includes provisions for maintaining and enforcing institutional controls under a Long-term Stewardship (LTS) Plan. We have determined that the document is generally acceptable and is conditionally approved, subject to the following conditions:

- EPA is currently developing model LTS language for use in developing LTS plans. The intent is to have consistency in the format and content of future LTS plans at various Superfund sites in Region 5 such as the Himco Dump site. We hope to provide such language to Bayer in the very near future. Once available, Bayer should incorporate such format and language into a revised ICIAP/LTS plan, to the extent possible; and

- References to "Deed Restrictions" to various parts of the document are erroneous and the term should be correctly referred to as "Deed Notices". There are no deed restrictions in place at this site. Please delete the former term and replace it with the latter throughout the document. After changes are made, submit the revised document to EPA and IDEM.

Your attention to this matter is appreciated. I can be reached at (312) 886-6195 if you have any questions on this matter.

Sincerely,

R. del Rosario

Ross del Rosario

cc: Doug Petroff, IDEM (electronic)
John Matson, ORC (electronic)

Appendix E – Institutional Controls Implementation and Assurance Plan

Institutional Controls Implementation and Assurance Plan

Himco Site, Elkhart, Indiana

Bayer HealthCare LLC

GHD | 26850 Haggerty Road Farmington Hills, MI 48331 USA

039611 | Report No 40 | April 30, 2019

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Figure Index

Table Index

1. Introduction

This Institutional Controls Implementation and Assurance Plan (ICIAP) also known as the Long-Term Stewardship (LTS) Plan presents procedures to implement, maintain and enforce institutional controls (ICs) at the Himco Site (Site), located in Elkhart, Indiana. GHD has prepared this ICIAP on behalf of the Performing Settling Defendants (PSDs), collectively known as the Himco Site Trust.

The Himco Site is a National Priorities List (NPL) site that was remediated pursuant to a Consent Decree (Civil Action No. 2:07cv304 (TS)) (CD). Appended to the CD (CD Appendix A) is the amended Record of Decision (ROD), which presents Remedial Action Objectives and a selected remedy. The Statement of Work (SOW), which is presented in the CD's Appendix B, identifies specific Remedial Action (RA) tasks, which include ICs to restrict use of the landfill property and certain adjacent properties.

The ICIAP is a document designed to systematically establish and document the activities associated with implementing and ensuring the long-term stewardship of ICs and specify roles and responsibilities. ICs were established as part of the remedy implementation under the CD, required to help minimize the potential for exposure to contamination and protect the integrity of the remedy. ICs will be monitored, maintained and enforced consistent with the plan presented in this ICIAP.

The lead Agency for the Site is the United States Environmental Protection Agency (USEPA) Region 5 with support from the Indiana Department of Environmental Management (IDEM).

2. Site Details

2.1 Site Description

The Site is a closed landfill located at the intersection of County Road 10 and North Nappanee Street in Cleveland Township, Elkhart County, Indiana. This former 60-acre unlined landfill, previously operated by Himco Waste Away Service, Inc., accepted waste including household refuse, construction rubble, medical waste, and calcium sulfate during its operation between 1960 and its eventual closure in 1976. **Figure 1** shows the Site location and **Figure 2** shows the layout of the Site, including property boundaries.

The Site consists of two major areas: the calcium sulfate-covered landfill and the 4-acre construction debris area (CDA). The CDA was subdivided into seven residential properties and one commercial property parcel.

Currently, the Site is a grassy field secured by a chain-link perimeter fence.

2.2 Site History

Prior to its commencing operation in 1960, part of the Site was used as a gravel pit.

In 1971 the Indiana State Board of Health (ISBH) identified the Site as an open dump.

In 1974 Himco Waste Away Services replaced six private, shallow water wells located near the Site that were experiencing color, taste and odor problems. The six shallow wells were replaced with deeper drilled wells. Himco signed a consent agreement with ISBH in 1975 that required Site closure by September 1976.

From 1974 to 1992, a number of environmental investigations were completed at the Site including a Remedial Investigation/Feasibility Study (RI/FS) from 1989 to 1992. Before the conclusion of the RI/FS, the USEPA added the Site to the NPL on February 21, 1990.

Upon completion of the RI/FS, the USEPA issued a Record of Decision (ROD), executed on September 30, 1993, which identified the selected Remedial Action (RA) for the Site. An Amended ROD (ROD-A) was issued on September 15, 2004 and prescribed: 1) enhancing the existing cover, ensuring at least 18 inches of soil cover throughout the landfill, and a gas management system, 2) removing debris and contaminated material from the CDA, 3) providing municipal drinking water to 39 homes south and southeast of the site, along with abandoning the drinking water wells from these homes, 4) implementing a long-term groundwater monitoring program, and 5) placing ICs on the landfill and other areas to limit future use, prohibit the installation of groundwater wells on site, and require the abandonment of private drinking water wells at homes provided with city water.

The Remedial Design/Remedial Action (RD/RA) was conducted pursuant to a CD, which became effective on November 27, 2007.

In 2011, the PSDs relocated CDA waste to the landfill, and completed the construction of a soil cover over the landfill in 2012. Simultaneously the PSDs installed new water mains in the neighborhood that is east of the Site and connected properties to the Elkhart municipal water supply as required by

signed Environmental Restrictive Covenants (ERC). USEPA approved the Construction Completion Report/Completion of Remedial Action Report (CRA, 2012) on October 31, 2012.

A landfill gas Passive Ventilation Trench (PVT) was installed in 2012 and was expanded in 2015 along the entire southern and eastern boundaries of the Site, consisting of slotted 4-inch Schedule 40 polyvinyl chloride (PVC) piping within a trench filled with a porous gravel column. The trench is approximately 3 ft wide and the slotted pipe was placed approximately 2 ft above the water table. In accordance with Part II, Section 4.2.3 of the ROD, the PSDs shall monitor the soil gas vented by the PVT to ensure that methane gas and hydrogen sulfide gas do not migrate off Site at concentrations greater than the Applicable or Relevant and Appropriate Requirements (ARARs).

Additionally, there are 28 permanent soil gas probes (SGPs) along the southern and eastern boundaries and there are 27 groundwater monitoring wells; all are subject to biennial sampling in conjunction with a biennial inspection.

After USEPA's Preliminary Closeout Report (PCOR) on July 19, 2012, the Himco Trust initiated the Operation & Maintenance (O&M) phase of the remedy and continues to implement and maintain compliance with the required O&M Plan. The most recent Five Year Review (FYR) was completed on March 1, 2016, which is included in the attachments. Because hazardous substances, pollutants, or contaminants remain in place at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE), USEPA plans to conduct a second FYR at the Himco site no later than March 2021.

In July 2018, the Himco Trust completed an additional sampling effort for remaining private wells near the landfill. The associated Private Well Sampling Report (GHD, September 2018) issued to USEPA/IDEM showed that all private wells exhibited arsenic results below the Maximum Contaminant Levels (MCL), with the exception of one address, 1241 N. Nappanee. In coordination with USEPA/IDEM, the Himco Trust is currently coordinating efforts to connect this property to the available public water supply and to abandon the existing well on the property in compliance with 312 IAC § 13-10-2.

In summary, the Himco Trust has successfully completed the remedies described above. Ongoing tasks include: ongoing soil gas monitoring, groundwater monitoring, inspections, routine reports, and IC implementation/assurance.

2.3 Property and Stakeholder Information

The landfill site property is currently owned by five (5) different private entities: Bayer Healthcare LLC, Cooper Land Company of New Jersey, Inc. (an affiliate of Bayer HealthCare, LLC), Indiana Michigan Power Company, CLD Corporation, and Giada Holdings, LLC (a Limited Liability Company that recently purchased landfill parcel J, formerly owned by Zap and CLD Corporation). All entities or their predecessors have granted access to the PSDs in the form of recorded Temporary Access Agreements binding on all successors and assigns. All landfill and surrounding private properties potentially affected by groundwater contamination that may be related to the Site have either signed ERCs or have implemented Deed Notices (DN), both of which are filed with the Elkhart County Recorder's Office. Site ownership for each of the listed entities is illustrated on **Figure 2,** which corresponds with Owners and Tax Identification Numbers presented on **Table 1**.

3. Key Elements of Institutional Controls

3.1 General Elements

USEPA defines ICs as non-engineered instruments, such as administrative and legal controls, that help to minimize the potential for exposure to contamination and/or protect the integrity of a response action. ICs are typically designed to work by limiting land and/or resource use or by providing information that helps modify or guide human behavior at a site.

Section 1.4 and 1.5 of the Himco Site ROD includes ICs in three (3) different operable units of the selected remedy: the 60 acre landfill, the residents living south of the landfill and the residential area east and southeast of the landfill. These ICs will prevent exposure to groundwater that could have water quality test results that exceed MCL.

The selected remedy for the 60 acre landfill

Items 7 & 8 of the ROD Selected Remedy for the 60 acre landfill:

> "*Institutional controls in the form of deed restrictions, or other appropriate institutional controls, which prohibit both future groundwater use and future drilling or digging into the landfill cover, will be implemented.*"
>
> *"Institutional controls will be placed on the landfill in form of deed restrictions, or other appropriate ICs, to limit the land reuse to industrial, recreational, or commercial. However a future land use feasibility study must be conducted by the entity responsible for the redevelopment of the property to determine the property's suitability for a particular reuse scenario. Any anticipated building construction on Himco Dump will have to be evaluated and approved by EPA, in consultation with Indiana Department of Environmental Management (IDEM) to determine the soil gas interaction/impact on any structures on the landfill, as well as the displacement of contaminated soils, wastes, etc."*

The selected remedy for the CDA and the residents living south of the landfill

Items II(A)(a)(2)(b) and II(B)(e) of the ROD Selected Remedy for the CDA and the residents living south of the landfill:

> *"Establish ICs in parallel with the landfill."*

Item III(A) of the ROD Selected Remedy for the CDA and Parcel F:

> *"If the excavated residential soils are not consolidated to parcel F, then an institutional control in the form of a deed restriction, or other appropriate ICs will be applied to the parcel to be zoned as commercial/industrial only, since the 695 mg/kg of lead detected in the soil is an acceptable level for an industrial setting."*

Item IV(B) of the ROD Selected Remedy for the CDA and the residents living south of the landfill:

> *"Establish institutional controls in the form of a deed restriction, or other appropriate ICs applied to each property to prohibit future installation of private water wells for groundwater use."*

The selected remedy for the residential area east and southeast of Himco Dump

Item 3 of the ROD Selected Remedy for the residential area east and southeast of Himco Dump:

> *"…Establish institutional controls in the form of a deed restriction, or other appropriate ICs applied to each property to prohibit future groundwater use."*

Section 1.5 of the Himco Site ROD (CD Appendix A) presents a summary list of ICs as follows.

Landfill Property

- *"Limit land use to industrial, recreational, or commercial uses either by recording a deed restriction or other appropriate institutional controls.*
- *Prohibit future groundwater use either by recording a deed restriction or other appropriate institutional controls.*
- *Prohibit future drilling or digging into the landfill cover either by recording a deed restriction or other appropriate institutional controls."*

Residential Properties (East and South)

- *"Prohibit future installation of any private wells for groundwater use and abandon the private well for each residential property after installation of the municipal water supply, per 312 IAC 13-10-2, ARAR's. See Table 15 (of the ROD), Himco Dump Well Abandonment List.*
- *Prohibit future installation of any private wells for groundwater use either by recording a deed restriction or other appropriate institutional controls.*
- *Prohibit the use of private wells in the area located south of Himco Dump located in the City of Elkhart up to the former Bower Street Well Field either by recording a deed restriction or other appropriate institutional controls."*

Parcel F Located South of the Landfill

- *"Limit land use to industrial, or commercial only, either by recording a deed restriction or other appropriate institutional controls."*

CD paragraph 26(b)(1)–(4) reiterates ROD Section 1.5 and adds additional ICs to be required if any construction debris is left on the residential properties south of the landfill or if construction debris is placed on Parcel FICs:

1. *"Restrictions on Use of Landfill Property*
    a. *Limit land use to industrial, recreational, or commercial uses either by recording a deed restriction or other appropriate institutional controls.*
    b. *Prohibit future groundwater use either by recording a deed restriction or other appropriate institutional controls.*
    c. *Prohibit future drilling or digging into the landfill cover either by recording a deed restriction or other appropriate institutional controls.*
2. *Restrictions on Use of Residential Properties (East and South)*

a. *Prohibit installation of private water wells for groundwater use and abandon the private well for each residential property receiving municipal water as a result of the Remedial Action.*

b. *Prohibit installation of private water wells for groundwater use for each residential property which received municipal water supply in 1992 as a result of the Remedial Removal Action.*

c. *Prohibit use of private water wells in the area located south of Himco Dump that are within the Elkhart City limits.*

3. *Restrictions on Use of Parcel F Located South of the Landfill*

a. *Limit land use to industrial, recreational or commercial only, either by recording a deed restriction or other appropriate institutional controls.*

b. *Establish institutional controls in parallel with the landfill if the excavated materials from the Construction Debris Area are disposed of on Parcel F.*

4. *Restrictions on Use of Construction Debris Area Residential Soil*

a. *If a soil cover is used for the residential soil in the Construction Debris Area (CDA), fence the soil cover and establish institutional controls or other appropriate institutional controls in parallel with the landfill."*

3.2 Specific Elements

The ICs that have been implemented are listed in this section. A complete list of properties subject to ICs is presented in **Table 1**.

3.2.1 Restrictions on Use of Landfill Property

Restrictions on use of the landfill property apply to the current property owners, which are:

1. Bayer Healthcare LLC – Parcel C
2. Cooper Land Company of New Jersey, Inc. – Parcels D, F, Q, and S
3. Indiana Michigan Power – Parcel G
4. Giada Holdings, LLC – Parcel J
5. CLD Corporation – Parcel that bisects Parcel J

Land use restrictions are memorialized in ERCs signed by Bayer Healthcare LLC and Indiana Michigan Power filed with the Elkhart County Recorder. Four (4) landfill parcels (D, F, Q, and S) – for which a signed ERC was in place – were transferred in January 2018 to Cooper Land Company of New Jersey Inc., an affiliate of Bayer HealthCare LLC. In 2018, Giada Holdings, LLC purchased Parcel J in a delinquent tax sale; this landfill parcel was formerly owned by Zap Distributing LLC and CLD Corporation. Since the former owners did not sign an ERC, a DN was placed on this parcel in April 2018. A recorded Temporary Access Agreement also places some additional controls on the property. CLD Corporation currently owns a thin 1.38 acre parcel (that bisects Parcel J) and this parcel is subject to an ERC. Additionally, the Elkhart County Private Well Ordinance No. 2017-24 applies to the landfill property and all surrounding parcels and places further restrictions on the installation of any groundwater wells.

The restrictions and obligations memorialized in each **ERC** are:

1. *"Prohibit any activity at the Himco Site that may interfere with any component of the remedy or activities pursuant to the Consent Decree, long-term monitoring or measuring necessary to assure the effectiveness and integrity of any response action, selected or undertaken at the Himco Site.*
2. *Not use the Himco Site for residential purposes, including, but not limited to daily care facilities (e.g. daycare centers, schools and senior citizen facilities), and shall limit the reuse to industrial, recreational, or commercial.*
3. *Neither engage in nor allow the installation or use of private drinking water wells on the Himco Site. There shall be no consumptive, extractive or other use of the groundwater underlying the Himco Site that could cause exposure of humans or animals to the ground water underlying the Himco Site, other than for site investigation and/or remediation purposes, without prior EPA and/or IDEM approval.*
4. *Neither engage in nor allow the digging or drilling into or the excavation of soil anywhere on the Himco Site as depicted on Exhibit B without first receiving written approval by the USEPA and/or IDEM at least thirty (30) days prior to the commencement of such work. Any removal, excavation or disturbance of soil from within the Affected Areas of the Himco Site must be conducted in accordance with all requirements of the Occupational Health and Safety Administration (OSHA) and Indiana OSHA (IOSHA), and soil that is removed, excavated or disturbed from the Himco Site must be managed and disposed of in accordance with all applicable federal and state laws and regulations.*
5. *Arrange for a future land use feasibility study to be conducted by any entity responsible for the redevelopment of the Real Estate (to determine the Real Estate's suitability for a particular reuse scenario via an evaluation by the EPA in consultation with IDEM).*
6. *At the completion of remediation, Owner shall modify this ERC, if EPA and/or IDEM determine that additional land use restrictions are necessary to be protective of human health and the environment as a result of residual contamination that will remain on the Real Estate."*

General Provisions of the landowner ERCs require the restrictions and obligations to:

- Prevent any conveyance of title, easement or other interest in the Real Estate from being consummated without adequate and complete provisions for compliance with the CD.
- Run with the land to subsequent landowners.
- Be binding on future landowners.
- Provide written notice of the presence of hazardous substances to future landowners or occupants.
- Provide notice of any conveyance to EPA, IDEM, and the PSD.
- Be governed by Indiana law.
- Provide access for IDEM and EPA.

In addition to the provisions cited above, the ERC instructs Indiana Michigan Power to direct the HIMCO Remediation Trust to re-record the ERC, including any subsequent modifications and amendments, forty-nine years after the date of first recording. The date of first recording was March 24, 2008 making the forty-nine year anniversary March 24, 2057. However, this requirement stems from a vestige of Indiana law that was changed in 2008 (see SEA 46, P.L. 18-2008, SECTIONS 2-3, Ind. Code 32-20-3-2). Therefore, re-recording is no longer necessary, even for ERCs recorded before the change in the law.

The Deed Notices provide notice to affected landowners that:

> *"…EPA concluded in the ROD for this Site that the activities listed below may increase the risk of exposure to contamination and present an imminent and substantial endangerment to public health, welfare, or the environment:*
>
> - *Coming into contact with contaminated groundwater in the landfill portion of the Site ("Landfill" through drilling or digging into the landfill;*
> - *Using the Landfill for residential purposes without appropriate institutional controls on the Landfill;*
> - *Intrusive drilling or digging at the Landfill, potentially exposing persons to contaminants in the soil or landfill gases present in the Landfill; and*
> - *Maintaining, operating or installing private wells or otherwise utilizing the groundwater at the Site."*
>
> *"…EPA intends to use this Notice as an IC as part of the Remedy to help reduce future potential exposure contamination. A person may be liable under Section 107(a) of CERCLA, 75 U.S.C. § 9607(a) if the person conducts activities at the Site which, among other things, cause the release of hazardous substances on-site. In order to qualify for certain conditional liability protections, namely the innocent landowner, bona fide prospective purchaser, or contiguous landowner protections under Sections 101(35)(A), 101(40)(F), 107(q)(1)(A)(v) of CERCLA, 42 U.S.C. §§ 9601(40)(F), and 9607(q)(1)(A)(v), a person must, among other things, (i) comply with any land use restrictions established or relied on in connection with the response action at a facility including the ROD for this Site, and (ii) not impede the effectiveness or integrity of any IC employed at the facility in connection with a response action, including the ROD for the Site."*

The Temporary Access Agreement filed with the Elkhart County recorder's office allows the PSDs to access the property to install a fence, perform sampling, construct and maintain the landfill cover, and perform other remediation activities. The Elkhart County Private Well Ordinance generally prohibits "new private water well construction and installation in areas of known groundwater contamination," which is defined to include "Superfund Sites, Environmental Restrictive Covenant Sites, and other ground water use restriction sites," without the approval of the designating agency (here, USEPA).

3.2.2 Restrictions on Use of Residential Properties (East and South)

Private residential properties located along [redacted] (south of the landfill) and located in a subdivision across [redacted] (east of the landfill) were selected to have ERC's. The Himco Trust previously obtained ERCs for the majority of the properties. In April 2018, Deed Notices

were recorded with the Elkhart County Recorder for residential properties that did not previously sign ERCs. The Elkhart County Private Well Ordinance also applies to these properties.

Property addresses, owners, and IC status are listed in **Table 1**.

The ERC land use restrictions and obligations are:

a. Prohibit any activity at the Real Estate that may interfere with the response activities, long-term monitoring or measures necessary to assure the effectiveness and integrity of any response action, or component thereof, selected and/or undertaken at the Real Estate pursuant to the Consent Decree.

b. Neither engage in nor allow the installation or use of private drinking water wells on the Real Estate. There shall be no consumptive, extractive or other use of the groundwater underlying the Real Estate that could cause exposure of humans or animals to the ground water underlying the Real Estate, other than for site investigation and/or remediation purposes, without prior EPA and/or IDEM approval.

c. Permit the PSDs or their representatives to permanently abandon operation of any private water well for groundwater use on the Real Estate in accordance with 312 IAC 13-10-2 following connection to municipal water supply.

d. At the completion of remediation, Owner shall modify this ERC, if necessary, at the request of EPA and IDEM to reflect any remaining contamination at the subject property.

The aforementioned general provisions of the landowner ERC/DN/Well Ordinance also remain applicable to this area.

3.2.3 Restrictions on Use of Parcel F Located South of the Landfill

Parcel F is now owned by Cooper Land Company of New Jersey, Inc. It is undeveloped land that is part of the landfill with frontage on County Road 10.

The restrictions on land use for Parcel F are the same as those aforementioned conditions for the landfill properties, except Parcel F is not subject to a future land use feasibility study. The ERC land use restrictions and obligations are:

a. Prohibit any activity at the Himco Site that may interfere with any component of the remedy or activities pursuant to the Consent Decree, long-term monitoring or measuring necessary to assure the effectiveness and integrity of any response action, selected or undertaken at the Himco Site.

b. Not use the Himco Site for residential purposes, including, but not limited to daily care facilities (e.g. daycare centers, schools and senior citizen facilities), and shall limit the reuse to industrial, recreational, or commercial.

c. Neither engage in nor allow the installation or use of private drinking water wells on the Himco Site. There shall be no consumptive, extractive or other use of the groundwater underlying the Himco Site that could cause exposure of humans or animals to the ground water underlying the Himco Site, other than for site investigation and/or remediation purposes, without prior EPA and/or IDEM approval.

d. Neither engage in nor allow the digging or drilling into or the excavation of soil anywhere on the Himco Site as depicted on Exhibit B without first receiving written approval by the EPA and/or IDEM at least thirty (30) days prior to the commencement of such work. Any removal, excavation or disturbance of soil from within the Affected Areas of the Himco Site must be conducted in accordance with all requirements of IOSHA/OSHA, and soil that is removed, excavated or disturbed from the Himco Site must be managed and disposed of in accordance with all applicable federal and state laws and regulations.

e. At the completion of remediation, Owner shall modify this ERC, if EPA and/or IDEM determine that additional land use restrictions are necessary to be protective of human health and the environment as a result of residual contamination that will remain on the Real Estate.

General Provisions of the Parcel F Environmental Restrictive Covenants include the following restrictions and obligations to:

- Prevent any conveyance of title, easement or other interest in the Real Estate from being consummated without adequate and complete provisions for compliance with the CD.
- Run with the land to subsequent landowners.
- Be binding on future landowners.
- Direct the HIMCO Remediation Trust to re-record the Environmental Restrictive Covenants, including any subsequent modifications and amendments forty nine years after the date of first recording. The date of first recording was February 2, 2008 making the forty nine year anniversary February 2, 2057. However, this requirement stems from a vestige of Indiana law that was changed in 2008 (*see* SEA 46, P.L. 18-2008, SECTIONS 2-3, Ind. Code 32-20-3-2). Therefore, re-recording is no longer necessary.
- Provide written notice of the presence of hazardous substances to future landowners or occupants.
- Provide notice of any conveyance to EPA, IDEM and the Performing Settling Defendants.

3.2.4 Restrictions on Use of Construction Debris Area Residential Soil

Construction debris waste was previously removed from the rear of the residential properties along [redacted] in lieu of installing a soil cover and protecting the area with an IC. Development and groundwater use restrictions remain in place as described above.

4. IC Maintenance Elements

The essential responsibility of IC maintenance is to ensure that IC instruments remain active and that property owners remain compliant with the restrictions and notice requirements of their individual Environmental Restrictive Covenants. ICs will be maintained until cleanup objectives have been achieved (i.e., until groundwater sampling results are less than applicable MCL levels for current parameters). Any IC non-compliance issues identified will be quickly addressed. The Himco Trust will undertake the following monitoring, reporting, and certification actions to assure compliance with ICs.

4.1 IC Compliance Monitoring, Reporting, & Certification

Annual Report

The landfill property is inspected biennially (along with groundwater/soil gas sampling events) to ensure that engineering controls remain in place. Land use is observed as a part of the inspection. Reporting the status of land use restrictions on the landfill property will occur in the quarterly progress reports that are already required under the CD (USEPA temporarily alleviated the monthly recurrence to quarterly on October 11, 2018). An annual certification that the landfill ICs remain in place will be submitted to USEPA by the Himco Trust.

- **Per the FYR, an Annual IC Monitoring, Compliance Assurance, and Certification Report (Annual Report) that will include a certification statement and results of IC reviews will be submitted to USEPA. It will demonstrate that the site was inspected to ensure no inconsistent uses have occurred, ICs remain in place and are effective, and any necessary contingency actions have been executed.**

Landfill Property

Since the Himco Site Trust controls the majority of the landfill property, they will not make any land use proposal nor cause any drilling or excavation that is not in conformance with the CD. Engineering controls and site land use are inspected and reported biennially to USEPA/IDEM under the Site Operation and Maintenance Plan.

- **The Himco Trust will declare compliance with the ERC in quarterly progress reports and in the Annual Report.**

Residential Properties (East and South)

Each IC defines restrictions and obligations for each land owner. Prohibited activity covers any activity that could interfere with the effectiveness and integrity of the remedy; in particular the installation and operation of groundwater wells is prohibited. All registered wells associated with properties that were connected to a municipal water supply have been abandoned in accordance with 312 IAC § 13-10-2.

To ensure future compliance and to ensure that property owners continue to adhere to the ERC/DN, the Himco Trust will verify – by December of the calendar year immediately preceding each FYR – with the Elkhart's Public Works and Utilities Department that no groundwater drinking wells have been

installed in the affected locations. (Per Elkhart Code 156.043(a): “Licensed plumbers and property owners shall report private wells used for potable water and for irrigation to the city Public Works and Utilities Department.”)

- **The Himco Trust will maintain compliance by verifying the absence of new groundwater drinking wells and changes in land use once during each FYR cycle and declare compliance in the Annual Report.**

Property Ownership & Zoning

General provisions of the ERC’s require that the land use restrictions be acknowledged and passed on to subsequent landowners or land users.

To ensure that any potentially new property owner receives a copy of the ERC/DN, the Himco Trust will verify – by December of the calendar year immediately preceding each FYR – with the Elkhart County Recorder’s Office that property ownership and zoning are unchanged. If new owners are identified, the Himco Trust will contact them to verify receipt the ERC/DN and ensure the associated compliance requirements are maintained.

- **The Himco Trust will maintain compliance by verifying implemented land use restrictions via the Elkhart County Recorder’s office (and current owners as needed) once during each FYR cycle and declare compliance in the Annual Report.**

5. IC Enforcement Elements

Any breach of an IC by any party subject to such IC could be an event triggering enforcement of the IC.

- For the landfill:
  - Unpermitted change in land use
  - Unpermitted excavation
  - Unpermitted installation or use of a water well
  - Any other activity that may be interpreted to contravene the ERC
- For the residential properties:
  - Unpermitted change in land use
  - Unpermitted installation or use of a water well
  - Restricted access to existing monitoring well
  - Any other activity that may be interpreted to contravene the ERC
- For Parcel F:
  - Unpermitted change in land use
  - Any other activity that may be interpreted to contravene the ERC

Triggering events discovered through the monitoring provisions of the IC Maintenance Elements will be reported to USEPA and IDEM in the quarterly progress reports.

The Himco Trust, which is responsible for enforcing ICs, will formally notify the affected property owner of any and all triggering events and will request a voluntary plan to conform to the ERC within 30 days. The voluntary plan will specify a reasonable schedule to restore compliance with the ERC.

If the property is not quickly brought into compliance with the ERC or a voluntary plan is not developed, the Himco Trust will coordinate with USEPA/IDEM and initiate further efforts as requested by USEPA/IDEM, up to and including legal action, to enforce compliance with the ERC/DN.

6. IC Modification and Termination Elements

ICs can be modified or terminated in response to changing conditions at any of the properties where an existing IC is in effect or at new properties that may be affected by changing environmental conditions that can be attributed to the landfill.

6.1 IC Modification

IC modification can be initiated by the Himco Trust, USEPA or IDEM. IC modification may be an appropriate response to any of the following conditions:

- An approved change in land use
- Contraction or expansion of the groundwater contaminant plume
- Other qualifying changes in environmental conditions

6.2 IC Termination

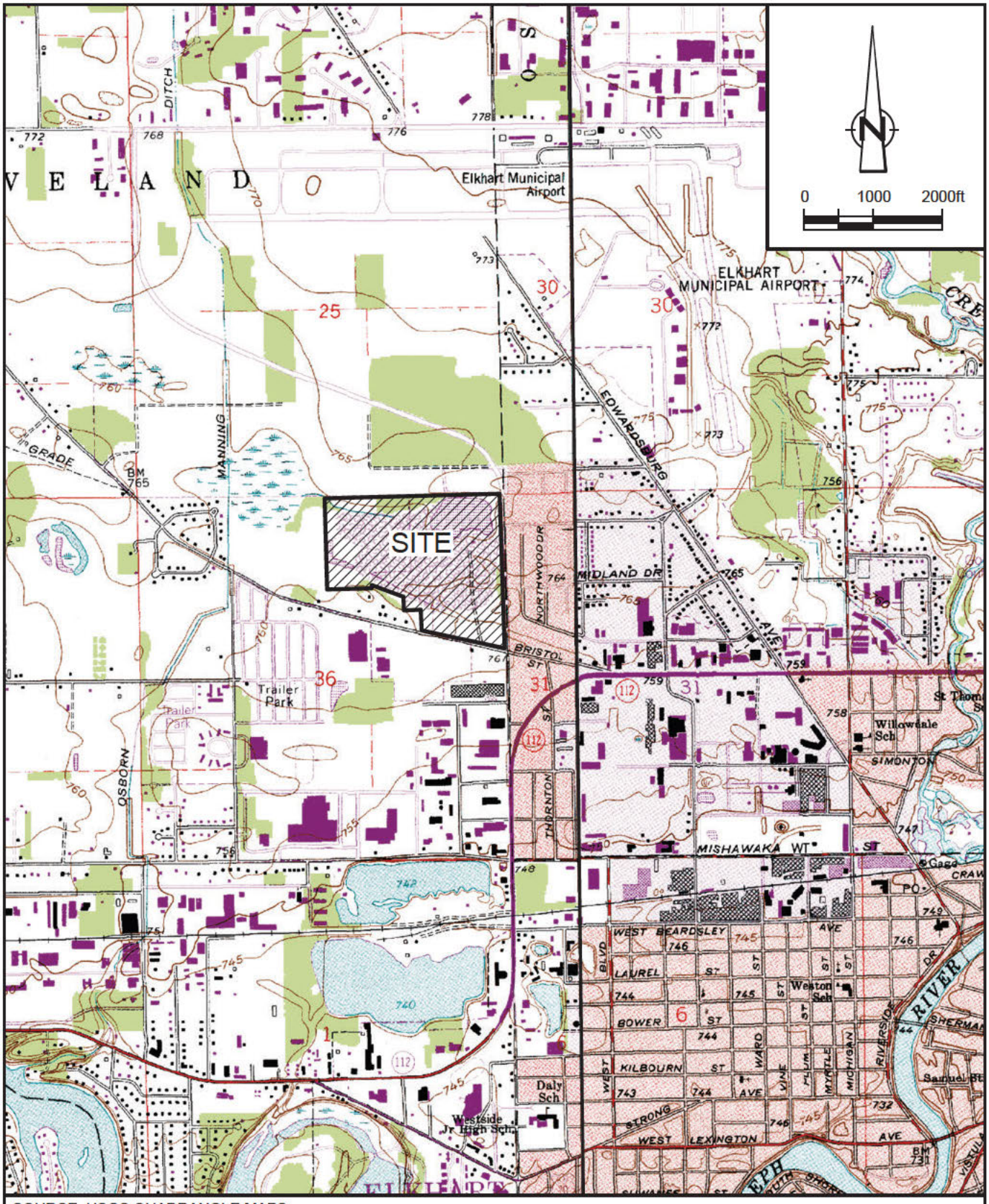
IC termination can be initiated by the Himco Trust, USEPA or IDEM. IC termination will require USEPA, IDEM, and property owner agreement.

IC termination can be initiated when remedial action performance objectives can be demonstrated.

For the landfill IC termination can be initiated when the landfill is demonstrated to no longer be a continuing source of groundwater contamination.

For groundwater IC termination could be initiated when groundwater contamination can be demonstrated to be less than groundwater MCL's.

The Himco Trust is committed to coordinating with USEPA/IDEM to ultimately delist the site from the NPL and eventually redevelop/repurpose the site in the future in compliance with the ICs.



SOURCE: USGS QUADRANGLE MAPS;
ELKHART AND OSCEOLA, INDIANA

FIGURE 1

SITE LOCATION
HIMCO SITE
Elkhart, Indiana

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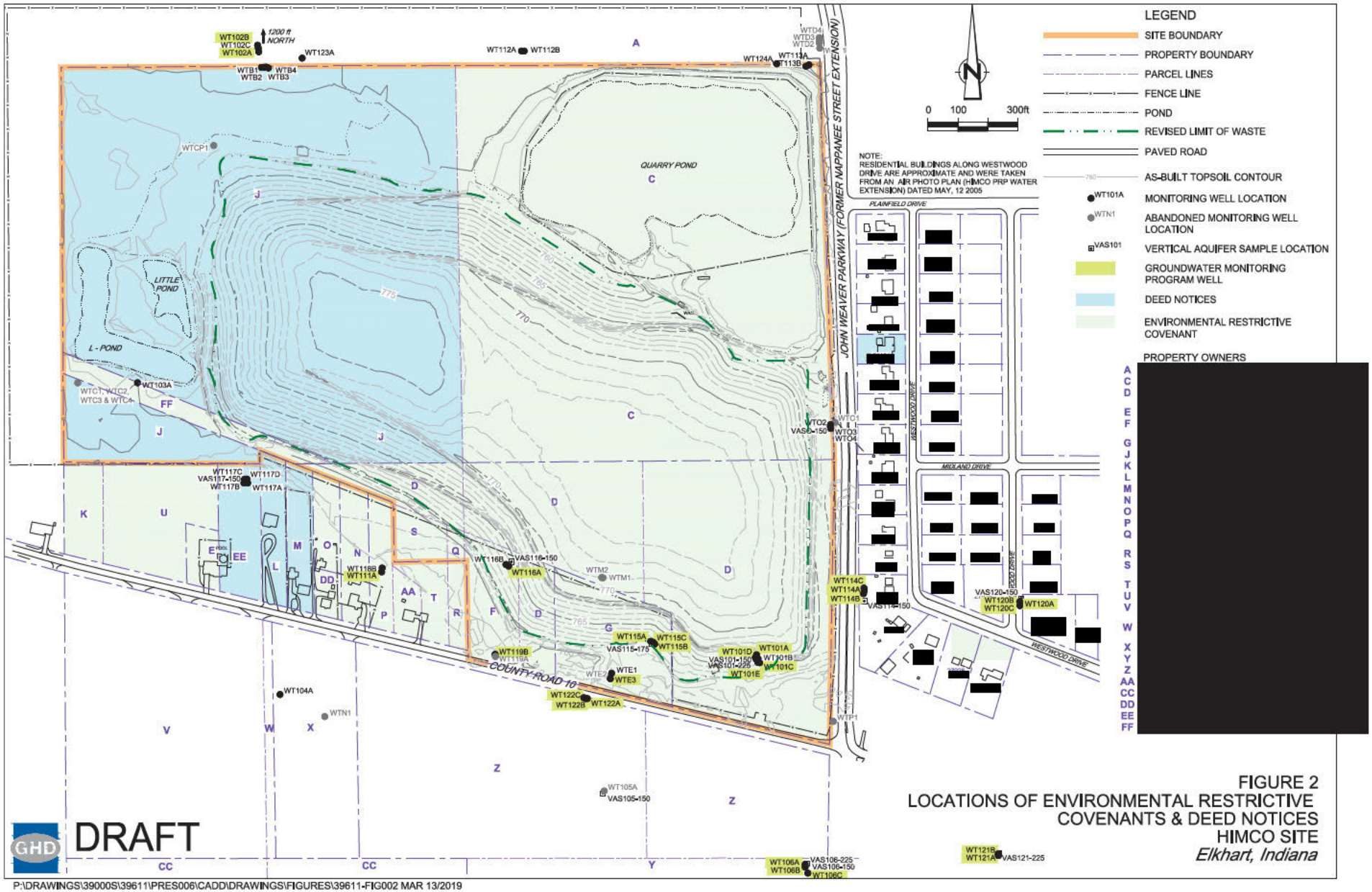


P:\DRAWINGS\39000S\39611\PRES006\CADD\DRAWINGS\FIGURES\39611-FIG002 MAR 13/2019

Table 1
HIMCO Site Property Ownership IC's

No.	Address (CD Parcel)	Tax Identification Number	Property Owner	IC Instrument
	Landfill Parcels			
1	Consent Decree Parcel C	01-36-226-001-006	Bayer Healthcare LLC	ERC 7/30/13
2	Consent Decree Parcel D, F, Q, & S	01-36-251-015-005; 01-36-276-003-005; 01-36-251-013-005; 01-36-276-001-006	*Cooper Land Company of New Jersey, Inc.* *(an affiliate of Bayer Healthcare LLC)*	ERC 1/15/09
3	Consent Decree Parcel G	01-36-276-004-006	Indiana Michigan Power	ERC 3/24/08
4	Consent Decree Parcel J	01-36-201-001-005	Giada Holdings, LLC *(formerly owned by Zap and CLD)*	**DN 4/25/18**
5	Thin Parcel bisecting J ("FF")	01-36-201-002-005	Wells Fargo Trustee for CLD Corporation	ERC 2/28/18
	Residential Parcels			
1		02-31-101-001-026		ERC 12/3/09
2		02-31-102-001-026		ERC 4/2/09
3		02-31-101-002-026		ERC 12/3/09
4		02-31-102-002-026		ERC 12/3/09
5		02-31-101-003-026		ERC 11/11/09
6		02-31-102-003-026		ERC 11/10/09
7		02-31-101-004-026		ERC 12/3/09
8		02-31-102-004-026		ERC 2/29/08
9		02-31-101-005-26		**DN 4/25/18**
10		02-31-102-005-026		ERC 12/3/09
11		02-31-101-006-026		ERC 12/3/09
12		02-31-102-006-026		ERC 12/3/09
13		02-31-101-007-026		ERC 12/3/09
14		02-31-102-007-026		ERC 12/3/09
15		02-31-101-008-026		ERC 2/29/08
16		02-31-102-008-026		ERC 1/15/09
17		02-31-101-009-026		ERC 2/3/09
18		02-31-101-010-026		ERC 2/29/08
19		02-31-101-011-026		ERC 2/29/08
20		02-31-101-012-026		ERC 1/31/08
21		02-31-101-013-026		ERC 9/4/08
22		02-31-101-014-026		ERC 2/29/08
23		02-31-177-001-026		ERC 9/4/08
24		02-31-177-002-026		ERC 2/29/08
25		02-31-177-003-026		ERC 2/29/08
26		02-31-151-001-026		ERC 2/29/08
27		02-31-151-002-026		ERC 2/29/08
28		02-31-151-003-026		ERC 2/29/08
29		02-31-151-004-026		ERC 2/29/08
30		025-31-152-017 and 018-026		ERC 2/29/08
31		02-31-152-019-026		ERC 12/3/09
32		02-31-151-008-026		ERC 9/4/08
33		02-31-151-007-026		ERC 9/4/08
34		02-31-151-006-026		ERC 12/3/09
35		02-31-151-005-026		ERC 7/28/09
36		02-31-152-001-026		ERC 11/27/07
37		02-31-152-003-026		ERC 2/29/08
38		02-31-152-004-026		ERC 2/29/08
39		02-31-152-002-026		ERC 2/29/08
40		01-36-251-019-005		ERC 2/29/08
41		01-36-251-008-005		ERC 2/29/08
42		01-36-252-003-005		ERC 3/24/08
43		01-36-251-007-005		ERC 2/29/08
44		01-36-251-006-005		ERC 3/24/08
45		01-36-251-005-005		**DN 4/25/18**
46		01-36-251-004-005		**DN 4/25/18**
47		01-36-251-017-005		ERC 4/6/16
48		01-36-251-020-005		**DN 4/25/18**
49		01-36-251-001-005; 01-36-251-021-005 01-36-126-001-005		ERC 2/1/18

Notes:

1 Engineering Controls for the landfill have been met by providing appropriate soil cover, vegetation, drainage control, and soil gas venting.

2 Engineering Controls for all affected private property owners have been implemented via connection to municipal water supply and abandoning private wells.

3 Cleanup objectives include meeting MCL's for groundwater contaminants including: arsenic, benzene, chloroform, 1,2-DCA(EDC), 1,2-DCP, vinyl chloride, calcium, iron, manganese, sodium, sulfate, 1,1-DCA, and cis-1,2-DCE.

4 Properties without Environmental Restrictive Covenants (ERC) were subject to Deed Notices (DN) implemented on April 25, 2018.

5 ERC's & DR's memorialize the Institutional Controls (IC), which dictate:

Institutional Controls	Landfill Parcels	Residential Parcels
Prohibit activity that interferes with the remedy.	X	X
Prohibit groundwater use and installation of private wells.	X	X
Abandon private wells.		X
Prohibit digging/drilling into landfill cover.	X	
Limit reuse to industrial, recreational, or commercial.	X	

Appendix F – Quarterly Progress Report – June 2019

Groundwater & Environmental Services, Inc.

1737 Georgetown Road, Unit E
Hudson, OH 44236

T. 877.505.9382

June 3, 2019

Reference No. 039611

Director, Superfund Division
c/o Mr. Rosauro del Rosario
EPA Project Manager/Coordinator
U.S. Environmental Protection Agency (USEPA), Region 5
77 West Jackson Boulevard
Chicago, Illinois
60604

Sent Via Email
delrosario.rosauro@epa.gov

Mr. John Matson
Associate Regional Counsel
U.S. Environmental Protection Agency (USEPA), Region 5
77 West Jackson Boulevard, C-14J
Chicago, Illinois
60604

Sent Via Email
matson.john@epa.gov

Mr. Douglas Petroff
Senior Environmental Manager
Indiana Department of Environmental Management (IDEM)
Federal Programs
MC 66-31, Room 1101
100 N. Senate Avenue
Indianapolis, Indiana
46206-6015

Sent Via Email
dpetroff@idem.in.gov

Dear: Director, Mr. del Rosario, Mr. Matson, and Mr. Petroff:

Re: Quarterly Progress Report – June 2019
Remedial Design/Remedial Action (RD/RA)
Himco Dump Site, Elkhart, Indiana (Site)

In accordance with your email on October 11, 2018, USEPA temporarily alleviated the monthly recurrence (Paragraph 31 of the HIMCO CERCLA RD/RA Consent Decree (CD), which was lodged with the United States District Court for the Northern District of Indiana on September 7, 2007) to quarterly with report submissions due in December, March, June, September, etc. This report is submitted by Groundwater & Environmental Services, Inc. (GES) on behalf of the Performing Settling Defendants (PSDs), collectively known as the Himco Site Trust (the Trust).

A Site plan that presents all monitoring locations is presented as **Figure 1** for your reference while reviewing this Progress Report.

1. Actions Taken Toward Achieving Compliance with the Consent Decree

The PSDs completed the following tasks since March 2019:

- No actions required.

2. Sampling/Test Results

- In April 2019, GES completed the biennial groundwater and soil gas sampling. Results will be incorporated under a future submission.

3. Deliverables Submitted During the Reporting Period

The PSDs submitted the following deliverables to USEPA during the quarterly reporting period:

- The Trust submitted the Institutional Controls Implementation and Assurance Plan (Long-Term Stewardship Plan) on December 12, 2018. USEPA provided conditional approval on April 3, 2019. The Trust resubmitted the plan on April 30, 2019 which incorporated minor changes (e.g., "deed restrictions" to "deed notices" and figure/table redactions).
- In April 2019, GES repaired fence and SGP damage resulting from winter vehicular accidents.
- In May 2019, GES completed the private well abandonment and connection to the municipal water supply for ESM Auto Sales LLC. The property at [redacted] has already been connected to the municipal water supply; thus, no further action is required.
- On May 31, 2019, the Biennial Soil Gas Monitoring Report was submitted documenting the soil gas monitoring activities and results that were collected in April 2019.

4. Projected Work for the Next 6 Weeks

The updated project schedule is attached as Figure 2. The Trust will commence and/or continue the following activities over the next six weeks:

The Trust and GES are beginning work on the next Annual Groundwater Monitoring Report which will include results from October 2018 and April 2019, as well as an enhanced discussion of recent reports, and recent endeavors and site controls to provide a current, holistic perspective of the site, condition, and future. It will also include a section with statistical/trend analyses for sampling data since 2012 (e.g., ~13 events) for relevant parameters and aquifers as outlined in the attached table.

5. Delays and Percentage Completion

None anticipated.

6. Proposed Modifications to Plans or Schedule

As permitted by the 2004 ROD, a request to reduce the soil gas sampling and landfill inspection frequency was submitted to the USEPA on August 1, 2018. The USEPA approved, via email, the request on August 2, 2018; the semi-annual schedule began in October 2018.

The O&M schedule is provided as Figure 2. The status (Planned, In Progress or Complete) of each task has been updated.

The schedule has been updated to present planned 2019 activities.

Several completed items have been "rolled up" to simplify the presentation of the schedule.

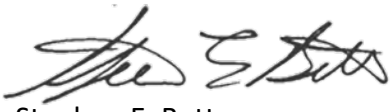
The schedule will be updated in each Quarterly Progress Report.

7. Community Relation Plan Support and Related Activities

There was no community relation plan support or related activities completed since December 2018.

Should you have any questions on the above, please do not hesitate to contact us.

Sincerely,
GROUNDWATER & ENVIRONMENTAL SERVICES, IINC.



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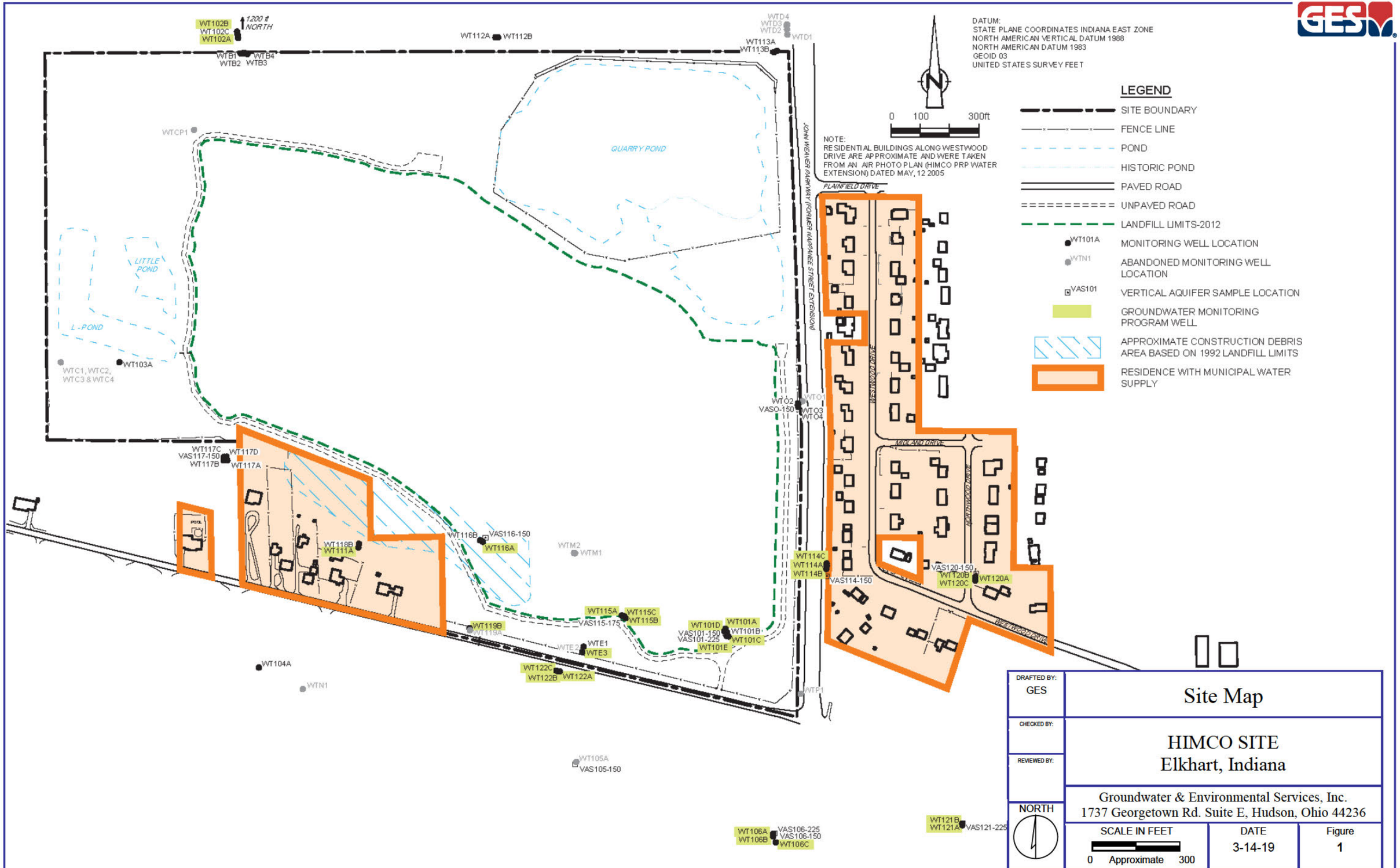
Encl.

cc: Matt Myers, Bayer Corporation Project Coordinator (via email)
Chintan Amin, Bayer Corporation (via email)

Figures



DRAFTED BY: GES	Site Map
CHECKED BY:	HIMCO SITE Elkhart, Indiana
REVIEWED BY:	Groundwater & Environmental Services, Inc. 1737 Georgetown Rd. Suite E, Hudson, Ohio 44236
NORTH	SCALE IN FEET: 0 Approximate 300 / DATE: 3-14-19 / Figure: 1

ID	Task Name	Duration (calendar days)	Start	Finish	Current Status
1	Construction Completion Report / Completion of Remedial Action Report	1 day	Wed 8/15/12	Wed 8/15/12	Complete
2	USEPA Review/Conditional Approval of Construction Completion Report / Completion of Remedial Action Report	28 days	Thu 8/16/12	Wed 9/12/12	Complete
3	Response to USEPA Review/Conditional Approval of the Construction Completion Report/Completion of Remedial Action Report	34 days	Thu 9/13/12	Tue 10/16/12	Complete
4	USEPA Approval of the Construction Completion Report/Completion of Remedial Action Report	1 day	Wed 10/31/12	Wed 10/31/12	Complete
5	Groundwater Monitoring Program	2371 days	Mon 4/23/12	Fri 10/19/18	In Progress
6	Groundwater Monitoring Program 2012 & 2013 Plan	2000 days	Mon 4/23/12	Fri 10/13/17	Complete
19	Groundwater Monitoring Program (S13)	5 days	Mon 4/23/18	Fri 4/27/18	Complete
20	Groundwater Monitoring Program (S14)	5 days	Mon 10/15/18	Fri 10/19/18	Complete
21	Groundwater Monitoring Program Reporting	2175 days?	Sat 12/1/12	Wed 11/14/18	In Progress
22	2012 Annual Groundwater Monitoring Report	210 days	Sat 12/1/12	Fri 6/28/13	Complete
31	2013 Annual Groundwater Monitoring Report	351 days	Tue 12/31/13	Tue 12/16/14	Complete
33	2014 Annual Groundwater Monitoring Report	349 days	Wed 12/17/14	Mon 11/30/15	Complete
39	2015 Annual Groundwater Monitoring Report	350 days	Mon 11/30/15	Sun 11/13/16	Complete
43	2016 Annual Groundwater Monitoring Report	81 days	Wed 11/30/16	Sat 2/18/17	Complete
48	2017 Annual Groundwater Monitoring Report	107 days	Thu 11/30/17	Fri 3/16/18	Complete
53	2018 Annual Groundwater Monitoring Report	360 days	Thu 11/30/17	Wed 11/14/18	Complete
57	O&M Site Inspections	2229 days	Mon 9/17/12	Wed 10/24/18	In Progress
58	O&M Site Inspection 2012 & 2013	463 days	Mon 9/17/12	Mon 12/23/13	Complete
65	O&M Site Inspection 2014	369 days	Thu 3/27/14	Mon 3/30/15	Complete
71	O&M Site Inspection 2015	188 days	Thu 6/25/15	Tue 12/29/15	Complete
75	O&M Site Inspection 2016	274 days	Wed 3/30/16	Wed 12/28/16	Complete
80	O&M Site Inspection 2017	267 days	Wed 3/29/17	Wed 12/20/17	Complete
85	O&M Site Inspection 2018	210 days	Thu 3/29/18	Wed 10/24/18	
86	O & M Site Inspection (Q1-18)	1 day	Thu 3/29/18	Thu 3/29 18	Complete
87	O & M Site Inspection (Q2-18)	1 day	Tue 6/12/18	Tue 6/12 18	Complete
88	O & M Site Inspection (2SA-18)	1 day	Wed 10/24/18	Wed 10/24/18	Complete
89	O&M Site Monitoring	2229 days	Mon 9/17/12	Wed 10/24/18	In Progress
90	O&M Site Monitoring 2012 & 2013	374 days	Mon 9/17/12	Wed 9/25/13	Complete
97	O&M Site Monitoring 2014	261 days	Thu 3/27/14	Fri 12/12/14	Complete
102	O&M Site Monitoring 2015	279 days	Mon 3/30/15	Sat 1/2/16	Complete
107	O&M Site Monitoring 2016	274 days	Wed 3/30/16	Wed 12/28/16	Complete
112	O&M Site Monitoring 2017	360 days	Fri 1/6/17	Sun 12/31/17	Complete
117	O&M Site Monitoring 2018	210 days	Thu 3/29/18	Wed 10/24/18	In Progress
118	O&M Site Monitoring (Q1-18)	1 day	Thu 3/29/18	Thu 3/29 18	Complete
119	O&M Site Monitoring (Q2-18)	1 day	Tue 6/12/18	Tue 6/12 18	Complete
120	O&M Site Monitoring (2SA-18)	1 day	Wed 10/24/18	Wed 10/24/18	Complete
121	Methane Investigation and Monitoring Plan (MIMP)/ Response to USEPA's October 25, 2012 letter	1118 days	Thu 11/8/12	Mon 11/30/15	Complete
181	USEPA Request for Information to Support 5 Year Review	195 days	Wed 2/18/15	Mon 8/31/15	Complete
185	USEPA 5 Year Review Report	875 days	Wed 3/9/16	Tue 7/31/18	Complete
186	Respond to Action Request in 5-Year Review Report	240 days	Wed 3/9/16	Thu 11/3/16	Complete
187	Prepare Institutional Control Stewardship Plan	37 days	Mon 8/1/16	Tue 9/6/16	Complete
188	Respond to Comments on IC Stewardship Plan	310 days	Sun 2/25/18	Mon 12/31/18	In Progress
189	Drainage Improvements	984 days	Sun 11/16/16	Sat 10/13/18	Complete
195	Private Well Sampling	62 days	Mon 7/23/18	Wed 9/12/18	Complete
196	Private Well Sampling	52 days	Mon 7/23/18	Wed 9/12/18	Complete

Date: Fri 12/7/18 | Task | Milestone | Summary | Progress

FIGURE 2: O&M SCHEDULE
HIMCO SITE, ELKHART, IN

Appendix G – 2020 Annual Groundwater Monitoring Report

HIMCO Site Trust

2020 Annual Groundwater Monitoring Report

HIMCO Landfill

Elkhart, Indiana

February 8, 2021

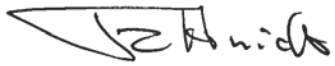
2020 Annual Groundwater Monitoring Report

HIMCO Landfill
Elkhart, Indiana

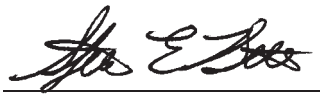
Prepared for:
HIMCO Site Trust
800 N. Lindbergh Blvd., R226
St. Louis, MO 63167

Prepared by:
Groundwater & Environmental Services, Inc.
1737 Georgetown Road, Unit E
Hudson, Ohio 44236
TEL: (877) 505-9382
www.gesonline.com

Date:
February 8, 2021



John E. Hnida
Geologist



Stephen E. Betts
Sr. Project Manager

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Acronyms

AGMR	Annual Groundwater Monitoring Report
AMSL	Above Mean Sea Level
BV	Background Value
CD	Consent Decree
CDA	Construction Debris Area
COCs	Chemicals of Concern
CRA	Conestoga-Rovers & Associates
DO	Dissolved Oxygen
DR	Deed Restrictions
ERC	Environmental Restrictive Covenants
FYR	Five Year Review
GES	Groundwater & Environmental Services, Inc.
GHD	Gutteridge Haskins & Davey
GMP	Groundwater Monitoring Program
GW RAO	Groundwater Remedial Action Objective
GWSDAT	Groundwater Spatiotemporal Data Analysis Tool
IAC	Indiana Administrative Code
IC	Institutional Controls
ICIAP	Institutional Controls Implementation and Assurance Plan
IDEM	Indiana Department of Environmental Management
MAROS	Monitoring and Remediation Optimization System
mg/L	milligrams per liter
MCL	Maximum Contaminant Level
NPL	National Priority List
NTU	Nephelometric Turbidity Units
ORP	Oxidation Reduction Potential
PSDs	Performing Settling Defendants
QAPP	Quality Assurance Project Plan
RA	Remedial Action
Report	2020 Annual Groundwater Monitoring Report
RD	Remedial Design
RDA	Recommended Dietary Allowance
RDL	Reporting Detection Limit
RD/RA	Remedial Design/Remedial Action
RSL	Tapwater Regional Screening Level
Site	Himco Landfill Site
SOW	Statement of Work
µg/L	microgram per liter
UCL	Upper Confidence Limit
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

1 Introduction

This 2020 Annual Groundwater Monitoring Report (AGMR) presents the results of routine groundwater monitoring completed in October 2019 and October/November 2020 at the Himco Landfill Site (Site), located in Elkhart, Indiana. Groundwater and Environmental Services, Inc. (GES) prepared this report on behalf of the Performing Settling Defendants (PSDs), collectively known as the Himco Site Trust.

The Site is a National Priorities List (NPL) site that is being remediated pursuant to a Consent Decree (Civil Action No. 2:07cv304 (TS)) (CD). The Statement of Work (SOW), included as Appendix B of the CD, specified the Remedial Action (RA) requirements for the Site. The SOW required groundwater investigations to the east and southeast of the Site and the implementation of a Groundwater Monitoring Program (GMP). GHD Group Pty Ltd, formerly known as Gutteridge Haskins & Davey (GHD) prepared a Remedial Design Work Plan (RD Work Plan) on behalf of the PSDs that combined the East and Southeast Groundwater Investigations and the GMP into a three-phase groundwater investigation that built incrementally to address the groundwater investigation and monitoring requirements of the SOW.

GHD completed quarterly groundwater monitoring between 2008 and 2011. GHD documented the results of previous monitoring rounds in a series of reports previously submitted to the United States Environmental Protection Agency (USEPA) and the Indiana Department of Environmental Management (IDEM). In accordance with the Interim Groundwater Monitoring Program Report (CRA, 2011), approved by USEPA on August 31, 2011, the GMP was modified to semi-annual groundwater monitoring with annual reporting each fall. In April 2015 and August 2016, USEPA provided letters commenting on the 2014 and 2015 AGMRs, respectively. These letters authorized further reductions to the current twelve parameters included in the GMP. In concert with approval from USEPA/IDEM on October 31, 2019 and subsequent discussions, the groundwater monitoring is currently conducted on an annual basis.

1.1 Background

The Site is a closed landfill located at the intersection of County Road 10 and North Nappanee Street in Cleveland Township, Elkhart County, Indiana. This former 60-acre unlined landfill, previously operated by Himco Waste Away Service, Inc., accepted waste including household refuse, construction rubble, medical waste, and calcium sulfate during its operation between 1960 and its eventual closure in 1976.

The Site was proposed for the NPL in 1988 and was placed on the NPL in 1990. The Remedial Design/Remedial Action (RD/RA) was conducted pursuant to the CD, which became effective on November 27, 2007. Currently, the Site is a grassy field secured by a chain-link perimeter fence.

A Site Location Map is supplied as **Figure 1**, showing the general location of the Site and surrounding area. A Site Map is presented as **Figure 2**, graphically depicting the layout of the Site, property boundaries, monitoring wells and neighboring properties. The Site consists of two major areas: the landfill and the 4-acre construction debris area (CDA). The CDA is located on

the northern portion of seven residential properties and one commercial property that front onto County Road 10. In 2011, the PSDs relocated CDA waste to the landfill, and completed the construction of a soil cover over the landfill in 2012. USEPA approved the *Construction Completion Report/Completion of Remedial Action Report* (CRA, 2012) on October 31, 2012.

1.2 Previous Investigations

Section II, Paragraph 4.3 of the SOW describes the requirements for the groundwater investigation east and southeast of the Site. The purpose of the investigation was to delineate the contaminant plume emanating from the Site that may potentially be impacting the adjacent aquifer and private water supply wells.

The Himco Site Trust completed a USEPA-approved phased groundwater investigation from 2008-2012 consisting of:

- Historic data compilation
- Existing monitoring well reconnaissance and survey
- Baseline groundwater monitoring
- Vertical aquifer sampling
- The Interim Groundwater Monitoring Program

1.2.1 Routine Groundwater Monitoring

GHD completed a Baseline Groundwater Sampling round in 2008. The purpose of this sampling was to determine if the existing monitoring wells were capable of providing representative groundwater samples and to establish baseline groundwater quality conditions. The Baseline Groundwater Sampling round represents the first routine quarterly groundwater quality monitoring round (Q1).

GHD completed the initial round of the Interim Groundwater Monitoring Program in February 2009. The Interim Groundwater Monitoring Program was completed on a quarterly basis between November 2008 and June 2011. GHD provided the results of the Interim Groundwater Monitoring Program to the USEPA in the following submissions:

- Q1 and Q2 - The Phase I Groundwater Investigation Report (CRA, May 2009)
- Q3 through Q6 - Himco Annual Groundwater Monitoring Report (CRA, July 2010)
- Q7 - The Phase II Groundwater Investigation Report (CRA, October 2010)
- Q8 - Interim Groundwater Monitoring Program Report (CRA, April 2011)
- Q9 through Q11 – 2011 Annual Groundwater Monitoring Report (CRA, November 2011)
- Q12 and Q13 – 2012 Annual Groundwater Monitoring Report (CRA, November 2012)

GHD completed the initial round of the semi-annual GMP (S1) in April 2012. The results of the S1 monitoring were provided in the 2012 Annual Groundwater Monitoring Report

(CRA, November 2012). The subsequent rounds of the GMP and the corresponding reports are as follows:

- S2 and S3 – 2013 Annual Groundwater Monitoring Report (CRA, November 2013)
- S4 and S5 – 2014 Annual Groundwater Monitoring Report (CRA, November 2014)
- S6 and S7 – 2015 Annual Groundwater Monitoring Report (GHD, November 2015)
- S8 and S9 – 2016 Annual Groundwater Monitoring Report (GHD, November 2016)
- S10 and S11– 2017 Annual Groundwater Monitoring Report (GHD, November 2017)
- S12 and S13 – 2018 Annual Groundwater Monitoring Report (GHD, November 2018)
- S14 and S15 – 2019 Annual Groundwater Monitoring Report (GES, November 2019)

GES completed the 16th and 17th round of the now annual GMP (S16 and S17) from October 22 to 25, 2019 and October 26 to 29/November 19, 2020, respectively. The results of the S16 and S17 monitoring rounds are provided in this AGMR. Future AGMR's will contain the data from one annual groundwater monitoring event. The next event is scheduled for Fall 2021.

1.3 Report Organization

This report is organized as follows:

- Section 2 Describes the scope of the routine groundwater monitoring activities completed at the Site during the two most recent events (10/2019 and 10-11/2020). The description includes a hydro geologic model, the groundwater flow regime, and presents hydraulic monitoring data.
- Section 3 Reviews information on recent reports and site controls.
- Section 4 Presents conclusions and outlines future routine groundwater monitoring activities.

2 Groundwater Gauging, Sample Collection, and Results

2.1 Site Hydrogeology

There are five principal hydrostratigraphic units beneath the Site. They are, in descending order:

- The Upper Aquifer
- The Intermediate Aquifer
- The Unnamed Silt/Clay Layer
- The Lower Aquifer
- The Bedrock

The Upper and Intermediate Aquifers beneath the Site have been conceptualized as one sand aquifer with silt/clay aquitard materials occasionally interspersed. The sand comprising the Intermediate Aquifer is generally more fine-grained than the overlying Upper Aquifer and it contains discontinuous zones of silt and clay.

The Unnamed Silt/Clay Layer underlies the Intermediate Aquifer and does not behave as a confining layer.

The sand and gravel Lower Aquifer is beneath the Unnamed Silt Clay layer. The elevation of the bedrock surface beneath the Site is variable, and therefore, so is the thickness of the Lower Aquifer, but it ranges up to 300 feet thick in the bedrock valley beneath the western portion of the Site.

2.2 Groundwater Elevation Monitoring

Two synoptic groundwater elevation monitoring rounds were conducted during this reporting period on October 22, 2019 (S16), and October 26 and November 19, 2020 (S17). **Table 3.1** provides the depth to water and groundwater elevation measured at each monitoring well during the water level rounds and during any subsequent groundwater sampling.

Figure 3.1, **Figure 3.2**, and **Figure 3.3** present groundwater elevation contours derived from groundwater elevation data collected on October 22, 2019 for the Upper Aquifer, Intermediate Aquifer and Lower Aquifer, respectively. **Figure 3.4**, **Figure 3.5**, and **Figure 3.6** present groundwater elevation contours derived from groundwater elevation data collected on October 26 and November 19, 2020 for the Upper Aquifer, Intermediate Aquifer and Lower Aquifer, respectively. The depth to groundwater near the Site is relatively shallow, with typical depths ranging from 4.18 to 15.57 feet. The elevation of groundwater near the Site ranges from approximately 747.01 to 757.68 feet above mean sea level (AMSL).

Figures 3.1 and **3.4** show that groundwater in the Upper Aquifer typically flows in a southerly direction. Overall groundwater flow is to the south and is consistent with the regional groundwater flow pattern. The horizontal hydraulic gradient in the Upper Aquifer is calculated to 0.00155 feet/feet for the October 2019 event and 0.00159 feet/feet for the October 2020 event.

As shown on **Figures 3.2** and **3.5**, groundwater in the Intermediate Aquifer typically flows in a southerly direction in October 2019 and October/November 2020, consistent with the regional groundwater flow pattern. East and southeast of the southeast corner of the Site, groundwater in the Intermediate Aquifer flows south. The horizontal hydraulic gradient in the Intermediate Aquifer is calculated to 0.00156 feet/feet for the October 2019 event and 0.00138 feet/feet for the October/November 2020 event.

Figures 3.3 and **3.6** show a south-southeasterly groundwater flow direction in the Lower Aquifer in both the October 2019 and October/November 2020 events. The horizontal hydraulic gradient in the Lower Aquifer is calculated to 0.00304 feet/feet for the October 2019 event and 0.00299 feet/feet for the October/November 2020 event.

2.3 Groundwater Quality/Results

This section of the 2020 AGMR describes the groundwater quality in the vicinity of the Site and discusses the nature and extent of groundwater contamination emanating from the Site.

This 2020 AGMR presents groundwater quality monitoring data for two semi-annual monitoring events, the S16 and the S17 rounds of the GMP that were completed in October 2019 and October/November 2020, respectively. **Table 4.1** provides the final readings of the low-flow sampling stabilization parameters measured in the field during the S16 and S17 monitoring rounds. Groundwater analytical reports are provided as **Appendix A**.

The following analytes are included in the GMP at the Site:

Volatile Organic Compounds (VOCs)

- Benzene
- 1,1-Dichloroethane (1,1-DCA)
- cis-1,2-Dichloroethene (cis-1,2-DCE)
- Vinyl chloride

Metals

- Arsenic
- Calcium
- Iron
- Lead
- Manganese
- Sodium

General Chemistry

- Sulfate
- Chloride

The following sections discuss the results of the S16 and S17 GMP rounds.

2.3.1 Field Parameters

Groundwater samples were collected after consistent and stable pH, temperature, conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP) and turbidity measurements were obtained. **Table 4.1** provides the final stabilized value for each field parameter.

DO and ORP values are generally low and negative, respectively, near a landfill because of reducing groundwater conditions generated in the landfill. This can locally increase metals solubility, and mobility, until oxidizing conditions are encountered and the metals precipitate. Excessive turbidity can also artificially elevate metals concentrations in groundwater samples. This is generally an artifact of the sampling process and does not reflect actual concentrations of metals dissolved in, and transported via groundwater.

2.3.2 Volatile Organic Compounds (VOCs)

A total of 59 groundwater samples from 27 monitoring wells (27 samples and 3 duplicates X 2 events, minus one duplicate sample), were collected and analyzed for VOC analysis. The

laboratory analytical results are summarized in **Table 1.1** and monitoring wells with detectable concentrations are depicted on **Figure 4.1** and **Figure 4.2**.

Benzene was the only VOC detected in routine groundwater monitoring samples at concentrations greater than its Primary Maximum Contaminant Level (MCL) (5 micrograms per liter [µg/L]). The four VOCs in the GMP parameter list were detected at the following frequencies:

- Benzene = 16.9 percent
- 1,1-DCA = 50.8 percent
- cis-1,2-DCE = 33.9 percent
- Vinyl chloride = 13.6 percent

The following is a summary of the frequency of detection of the VOCs in each aquifer for the October 2019 and October/November 2020 groundwater quality monitoring results:

Table 1 – Number of VOC Detections/Number of Samples

Parameter	Upper Aquifer	Intermediate Aquifer	Lower Aquifer
Benzene	10/26	0/27	0/6
1,1 DCA	14/26	16/27	0/6
cis- 1,2-DCE	13/26	7/27	0/6
Vinyl chloride	4/26	4/27	0/6

2.3.3 Benzene

As shown in **Table 4.2**, benzene was detected in 10 of 59 groundwater samples collected from the entire monitoring well network during this reporting period, or 16.9 percent of the groundwater samples. The detected concentrations of benzene ranged from 0.92 J µg/L to 23 µg/L. **Figure 4.1** and **Figure 4.2** depict routine groundwater quality monitoring results for monitoring wells with detectable concentrations of benzene for the S16 and S17 events.

The concentration of benzene was greater than the Primary MCL of 5 µg/L in Upper Aquifer monitoring well WT115A during the S17 event and in each of the groundwater samples collected from WT115B during both monitoring events. As shown on **Figure 4.1**, monitoring wells WT115A and WT115B are Upper Aquifer monitoring wells located in the southeast corner of the Site, near the limit of waste. The historic benzene results for routine groundwater monitoring samples collected from WT115A (Upper Aquifer), WT115B (Upper Aquifer), and WT115C (Intermediate Aquifer) were as follows:

Table 2 – WT115A/B/C Benzene Concentrations

Date	WT115A	WT115B	WT115C
11/6/2008	5.7/9.3	Not Installed	Not Installed
2/12/2009	12	Not Installed	Not Installed
5/6/2009	1.0 U/0.43 J	Not Installed	Not Installed
8/5/2009	9.9	Not Installed	Not Installed
11/6/2009	12/12	Not Installed	Not Installed
3/2/2010	9.8	Not Installed	Not Installed
6/17/2011	0.69 J	Not Installed	Not Installed
9/15/2010	10	Not Installed	Not Installed
12/13/2010	16	Not Installed	Not Installed
3/11/2011	3.6	30	1.0 U
6/22/2011	1.0 U	29	1.0 U
9/20/2011	2.9	11	1.0 U
12/14/2011	Not Sampled	34	Not Sampled
4/26/2012	1.0 U	30	1.0 U
9/20/2012	16	31	Not Sampled
4/25/2013	1.0 U/1.0 U	32	1.0 U
9/24/2013	7	22	1.0 U
4/24/2014	1.0 U	23	1.0 U
9/25/2014	1.0 U	31/31	1.0 U/1.0 U
5/7/2015	1.0 U	21	1.0 U
9/24/2015	1.1	18	1.0 U
4/28/2016	1.0 U	21/22	1.0 U
10/5/2016	1.0 U	19/18	1.0 U
4/12/2017	1.0 U	12	1.0 U
4/27/2018	1.0 U	13	1.0 U
10/25/2018	1.9	16	1.0 U
4/24/2019	1.0 U	15	1.0 U
10/24/2019	1.9	23	1.0 U
10/29/2020	5.4	21	1.0 U

Notes:

All laboratory data is reported in micrograms per liter

5.7/9.3 Duplicate sample result
J Estimated concentration
U Not-detected at the associated value

Benzene was also detected in groundwater monitoring samples collected from three other monitoring wells during S16 and S17 groundwater quality monitoring rounds, as follows:

Table 3 – S16 and S17 Benzene Detections

Well	Number of Detections/ Number of Samples	Range of Benzene
WT101A	2/2	1.4 – 1.7
WT111A	2/2	0.92 J – 0.94 J
WT116A	2/2	4.2 – 4.4

Note:
All laboratory data is reported in micrograms per liter
J Estimated concentration

All five of the wells where benzene was detected are in the Upper Aquifer. As shown on **Figure 4.1**, these Upper Aquifer monitoring wells are located along the southern limit of waste. Monitoring wells WT122, WT106, and WT121 are located south of the these monitoring wells with detections and are below MCLs.

Benzene was not detected above the RDL of 1.0 µg/L in any groundwater samples collected from Intermediate or Lower Aquifer monitoring wells during S16 and S17.

The pattern of low concentrations of benzene dissolved in Upper Aquifer groundwater along part of the southern edge of the landfill is consistent with a relatively weak local source of benzene near WT115A and WT115B.

- Benzene results for this monitoring period are consistent with the historic benzene concentrations in groundwater samples collected from WT115B that range between 11 µg/L and 34 µg/L.
- Benzene concentrations in groundwater samples from WT115A prior to 2014 fluctuated between less than 1 µg/L to 16 µg/L. Beginning in 2013, benzene had only been detected in three of 12 groundwater samples, however was detected during the S16 and S17 events. The concentration of 1.9 µg/L in the October 2019 groundwater sample was less than the MCL, but the sample from the October/November 2020 event exceeded the MCL of 5 µg/L, at 5.4 µg/L.

2.3.4 1,1-Dichloroethane (1,1-DCA)

As summarized in **Table 4.2**, 1,1-DCA was detected in 30 of 59 routine groundwater samples collected from the monitoring well network during this reporting period, or 50.8 percent of the samples. The concentrations of 1,1-DCA ranged from 0.32 J µg/L to 7.0 µg/L. There is no MCL for 1,1-DCA. USEPA requested that the Himco Site Trust compare 1,1-DCA results to the calculated Tapwater Regional Screening Level (RSL) of 240 µg/L, which is based on an excess cancer risk of 1×10^{-5}. The maximum 1,1-DCA concentration is 2.9 percent of the GW RAO.

Figure 4.1 and **Figure 4.2** depict routine groundwater quality monitoring results for monitoring wells with detectable concentrations of 1-DCA for the S16 and S17 events.

Table 4 – S16 and S17 1,1-DCA Detections

Well	Number of Detections/Number of Samples	Range of 1,1-DCA Concentrations
WT101A	3/3	4.9 – 7.0
WT101D	2/2	3.0 – 3.4
WT101E	2/2	1.1 – 1.5
WT106A	2/2	1.4 – 1.6
WT106B	2/2	1.1 – 2.3
WT111A	2/2	4.4 – 4.6
WT114B	3/3	0.53 J – 0.87 J
WT114C	2/2	0.43 J – 0.44 J
WT115A	2/2	3.2 J – 1.6
WT115B	2/2	4.5 – 4.6
WT115C	2/2	2.0 – 2.3
WT116A	2/2	4.0 – 4.1
WT121A	2/2	1.2 – 1.5
WT122B	2/2	0.79 J – 1.0

Note:
All laboratory data is reported in micrograms per liter
J Estimated concentration

1,1-DCA was detected in groundwater samples collected during the reporting period from Upper and Intermediate Aquifer monitoring wells located along the southern Site boundary. 1,1-DCA was also detected in groundwater samples collected from Upper Aquifer monitoring wells WT106A and WT121A, located south and southeast of the Site. The detected concentrations were significantly less (<1.0 to 2.3 μg/L) than the calculated Tapwater RSL of 240 μg/L.

1,1-DCA was also detected at estimated concentrations below the RDL (1.0 μg/L) in groundwater samples from Intermediate Aquifer monitoring wells WT114B and WT114C, located east of the Site. 1,1-DCA was not detected in groundwater samples collected from Intermediate Aquifer monitoring wells WT120A and WT120B, which are located further east and delineate the eastern limit of 1,1-DCA in the Intermediate Aquifer.

1,1-DCA was not detected in groundwater samples collected from any of the Lower Aquifer monitoring wells during this reporting period.

Consistent with previous 1,1-DCA monitoring data and reports, the pattern of widespread, low-concentration 1,1-DCA detections is not consistent with a distinct, high-concentration VOC source. The distribution of 1,1-DCA in groundwater at the Site is more consistent with residual contamination undergoing degradation in the absence of ongoing contaminant loading.

2.3.5 cis-1,2-Dichloroethene (cis-1,2-DCE)

cis-1,2-DCE was detected in 20 of 59 routine groundwater samples collected during this reporting period, or 33.9 percent of the samples (**Table 4.2**). The range of detected concentrations was from 0.17 J µg/L to 2.5 µg/L. Concentrations of cis-1,2-DCE in all groundwater samples did not exceed the Primary MCL of 70 µg/L for cis-1,2-DCE. The maximum cis-1,2-DCE concentration of 2.7 µg/L is 3.9 percent of the GW RAO.

Figure 4.1 and **Figure 4.2** depict routine groundwater quality monitoring results for monitoring wells with detectable concentrations of cis-1,2-DCE for the S16 and S17 events.

The distribution of cis-1,2-DCE is similar to the distribution of 1,1-DCA. cis-1,2-DCE was detected in groundwater samples from the following eleven monitoring wells:

Table 5 – S16 and S17 cis-1,2-DCE Detections

Well	Number of Detections/Number of Samples	Range of cis-1,2-DCE Concentrations
WT101A	2/2	4.9 – 7.0
WT101D	2/2	0.53 J – 0.62 J
WT101E	1/2	0.24 J
WT106A	2/2	0.23 J – 0.23 J
WT111A	1/2	0.20 J
WT114B	2/3	0.17 J – 0.32 J
WT115B	2/2	1.8 – 2.0
WT115C	2/2	0.49 J – 0.51 J
WT116A	2/2	1.9 – 2.5
WT121A	2/2	1.3 – 1.4
WT122A	2/2	0.76 J – 0.82 J

Note:
All laboratory data is reported in micrograms per liter
J Estimated concentration

As shown on **Figure 4.1** and **Figure 4.2**, cis-1,2-DCE was detected in groundwater samples collected from the Upper and Intermediate Aquifer monitoring wells located along the southern Site boundary. cis-1,2-DCE was detected in the groundwater samples collected from WT106A and WT121A, located southeast of the Site, at a maximum concentrations of 1.4 µg/L.

cis-1,2-DCE was also detected east of the Site in groundwater samples collected from Intermediate Aquifer monitoring well WT114B, but not in samples from Intermediate Aquifer monitoring wells WT120A and WT120B, located further east of the Site.

cis-1,2-DCE was not detected (RDL=1.0 µg/L) in groundwater samples collected from Lower Aquifer monitoring wells.

The distribution of cis-1,2-DCE in groundwater near the Site during the S16 and S17 monitoring events were similar to each other and consistent with baseline monitoring results. The spatial pattern of widespread, low-concentration cis-1,2-DCE detections and the stable distribution of

VOCs over time is consistent with residual contamination undergoing degradation in the absence of ongoing contaminant loading.

2.3.6 Vinyl Chloride

Vinyl chloride was detected in eight of 59 groundwater samples collected from the monitoring well network during this reporting period, or 13.6 percent of the samples (**Table 4.2**). Vinyl chloride concentration detections in groundwater samples ranged from 0.46 J µg/L to 1.1 µg/L, as follows:

Figure 4.1 and **Figure 4.2** depict routine groundwater quality monitoring results for monitoring wells with detectable concentrations of vinyl chloride for the S16 and S17 events.

Table 6 – S16 and S17 Vinyl Chloride Detections

Well	Number of Detections/Number of Samples	Range of Vinyl Chloride Concentrations
WT106B	2/2	0.46 J – 0.61 J
WT116A	2/2	0.89 J – 1.1
WT121B	2/2	0.89 J – 0.99 J
WT122A	2/2	0.51 J – 0.51 J

Note:
All laboratory data is reported in micrograms per liter
J Estimated concentration

Figures 4.1 and **4.2** depict vinyl chloride results for the Upper and Intermediate Aquifer for S16 and S17. Vinyl chloride was present in groundwater samples collected from the monitoring wells south of the Site, but at concentrations less than the GW RAO (MCL = 2.0 µg/L).

The concentrations of vinyl chloride detected in Lower Aquifer groundwater samples were less than the MCL of 2 µg/L.

Vinyl chloride is produced in reducing environments by the degradation of chlorinated organic compounds. The distribution of vinyl chloride in groundwater in the vicinity of the Site during the S16 and S17 monitoring rounds is consistent with the baseline monitoring results. The relatively low-level, stable vinyl chloride concentrations are consistent with residual contamination undergoing degradation in the absence of an ongoing source of VOC contaminants.

2.4 Metals and General Chemistry Analytes

2.4.1 Introduction

A total of 58 groundwater samples were collected from 27 monitoring wells during S16 and S17 for select metals and general chemistry analyses. **Tables 4.3 and 4.4** summarize the metals and general chemistry results for the groundwater samples collected from the Upper, Intermediate, and Lower Aquifers, respectively, during the reporting period. The laboratory analytical results for select metals and general chemistry are summarized in **Table 1.2**, **Table 1.3** and **Table 1.4**.

For background data quality comparison, GES collected groundwater samples from monitoring wells WT102A, WT102B, and WT102C for metals and general chemistry parameters. These wells are located approximately 1,260 feet north of and upgradient of the Site. The 2012 Himco Annual Groundwater Monitoring Report (CRA, 2012) included a statistical analysis of data from these wells to determine background concentrations to compare with concentrations measured at other locations at the Site. **Tables 1.2** through **1.4** provide the background concentrations for the metals parameters for the Upper, Intermediate and Lower Aquifers, respectively. Several of the background threshold values (BVs) exceeded their respective Primary MCL, Secondary MCL or Recommended Dietary Allowance (RDA).

The CD states that the GW RAOs are to prevent the use of groundwater that contains Site-related carcinogens and non-carcinogens in excess of MCLs. The CD also states that the GW RAOs are:

> *To prevent the use of groundwater which contains site-related sodium, calcium, and iron in excess of their upper intake limit or recommended dietary allowances for sensitive populations.*

However, nearby affected properties - in accordance with Environmental Restrictive Covenants (ERC) and Deed Restrictions (DR) - are prohibited from installing and utilizing groundwater wells; their private wells were abandoned in conjunction with connection to municipal drinking water.

There are no Primary MCLs for sodium, calcium, iron and manganese. There are Secondary MCLs for sodium (250 milligrams per liter [mg/L]) and iron (0.3 mg/L), but these are aesthetic criteria and are not health based. There is a health-based Tapwater RSL for iron of 26 mg/L. The RDA for calcium is 250 mg/L. In order to establish appropriate GW RAOs, GES ranked these criteria as follows:

1. Primary MCLs
2. Tapwater RSL
3. RDA
4. Secondary MCLs

For example, there is no Primary MCL for iron, so the next level of criteria is the health based RSL Tapwater of 26 mg/L. There is no Primary MCL, Tapwater RSL or RDA for chloride. Therefore, the best available criterion for chloride is the Secondary MCL of 250 mg/L.

The following are the exceedances of the metals and general chemistry GW RAOs in each of the aquifer units:

Table 7 – Number of Exceedances of GW RAOs/Number of Samples (Metals and General Chemistry)

Parameter	Upper Aquifer	Intermediate Aquifer	Lower Aquifer
Arsenic	1/25	5/27	1/6
Calcium	4/25	0/27	0/6
Iron	2/25	0/27	0/6
Lead	2/25	0/27	0/6
Manganese	6/25	0/27	0/6
Sodium	2/25	0/27	0/6
Chloride	1/25	0/27	0/6
Sulfate	0/26	0/27	0/6

GES selected arsenic, calcium, manganese, sodium, and chloride for discussion purposes as these analytes are of concern to the USEPA and IDEM and have shown historical concentrations greater than their respective GW RAOs.

2.4.2 Arsenic

Arsenic was detected in 48 of the 58 routine groundwater quality monitoring samples collected for select metals and general chemistry during the reporting period. Arsenic concentrations ranged from 0.81 J µg/L to 18 µg/L. The GW RAO for arsenic is 10 µg/L, which is equal to its Primary MCL. Arsenic is the only metal parameter detected during the S16 and S17 monitoring rounds at concentrations greater than a GW RAO that is based on a Primary MCL.

Arsenic concentrations in groundwater samples collected from Upper Aquifer monitoring wells during S16 and S17 monitoring rounds were less than the GW RAO of 10 µg/L, except for WT121A during the S17 event. The arsenic concentration in monitoring well WT121A during the S17 event was 14 µg/L.

Figure 4.3 and **Figure 4.4** show the arsenic concentrations in groundwater samples collected from the monitoring wells from each aquifer. The concentrations of arsenic exceeded the GW RAO in S16 and S17 samples from the following Intermediate Aquifer monitoring wells:

Table 8 – S16 and S17 Arsenic Concentrations

Well	Date	Arsenic Concentration
WT114C	10/24/2019	18/14
WT114C	10/28/2020	16
WT121B	10/23/2019	14
WT121B	11/19/2020	12

Note:
All metals laboratory data is reported in micrograms per liter

Intermediate Aquifer monitoring well WT114C is located immediately east of the Site and WT121B is located southeast of the Site and east of WT106B.

Figure 4.3 and **Figure 4.4** shows the arsenic concentrations in groundwater samples collected from Lower Aquifer monitoring wells during S16 and S17. The arsenic concentration in the groundwater sample collected from WT106C during the October 2019 event was 12 µg/L, exceeding the GW RAO of 10 µg/L. However, during the October 2020 event the result was less than the GW RAO at 9.4 µg/L. These are consistent with previous results.

2.4.3 Calcium

Calcium was detected in all of the 58 routine groundwater quality monitoring samples collected for select metals and general chemistry during this reporting period. Calcium concentrations in groundwater samples ranged from 43,000 µg/L to 640,000 µg/L. The GW RAO for calcium is 250,000 µg/L, and is equal to its RDA.

Figure 4.3 and **Figure 4.4** show the calcium concentrations in groundwater samples collected from the monitoring wells from each aquifer. There is a plume of calcium in the Upper Aquifer defined by exceedances of the GW RAO (250,000 µg/L). Calcium concentrations in the Upper Aquifer greater than the GW RAO were detected in groundwater samples collected from the following monitoring wells:

Table 9 – S16 and S17 Calcium Concentrations

Well	Date	Calcium Concentration
WT115B	10/24/2019	290,000
WT115B	10/29/2020	330,000
WT116A	10/24/2019	600,000
WT116A	10/29/2020	640,000 B

Note:
All laboratory data is reported in micrograms per liter

The maximum calcium concentrations in the Upper Aquifer were detected in groundwater samples collected from monitoring well WT116A, located within the limit of the waste in the south-central portion of the Site. Calcium concentrations have also typically exceeded the GW RAO in groundwater samples collected from monitoring well WT115B, located in the southeast portion of the Site within the limits of waste.

Calcium concentrations in the Intermediate and Lower Aquifers were less than the GW RAO.

The calcium concentrations in groundwater samples collected at the Site are generally stable and only exceed the GW RAO in the Upper Aquifer in the immediate vicinity of the former landfill area. The calcium data for the S16 and S17 routine groundwater quality monitoring rounds are

generally consistent with the baseline groundwater monitoring results from September 2011 and other routine monitoring data.

2.4.4 Manganese

Manganese was detected in 53 of the 58 routine groundwater quality monitoring samples collected for select metals and general chemistry during the reporting period. The concentrations of manganese in groundwater samples ranged from 6.6 J µg/L to 2,100 µg/L. The GW RAOs for manganese in the Upper and Lower Aquifers are 1,070 µg/L and 1,140 µg/L, respectively, which are the respective BVs for those aquifers. The GW RAO for manganese in the Intermediate Aquifer is 880 µg/L, which is its Secondary MCL.

Figure 4.3 and **Figure 4.4** show the manganese concentrations in groundwater samples collected from the monitoring wells from each aquifer. The samples that contained manganese at concentrations that were greater than the GW RAO were as follows:

Table 10 – S16 and S17 Manganese Concentrations

Well	Date	Manganese Concentration
WT101A	10/25/2019	1,200
WT101A	10/28/2020	1,300
WT116A	10/24/2019	2,100
WT116A	10/29/2020	1,500

Note:
All laboratory data is reported in micrograms per liter

WT101A and WT116A are located along the southern limit of waste.

The maximum manganese concentrations in the Intermediate and Lower Aquifer groundwater samples were 190 µg/L and 31 µg/L, respectively, which are less than the respective GW RAOs of 880 µg/L and 1,140 µg/L.

The manganese data for the S16 and S17 routine groundwater quality monitoring rounds are generally consistent with previous monitoring rounds including baseline groundwater monitoring results from September 2011.

2.4.5 Sodium and Chloride

Sodium was detected in all 58 of the routine groundwater quality monitoring samples collected for select metals and general chemistry during the reporting period. Sodium concentrations in groundwater samples ranged from 480 µg/L to 270,000 µg/L. The GW RAO for sodium is 150,000 µg/L, which is its RDA.

Chloride was detected in 57 of the 58 groundwater samples collected for select metals and general chemistry from the monitoring well network during this reporting period. The detected

concentrations of chloride ranged from 2.6 mg/L to 340 mg/L. The GW RAO for chloride is 250 mg/L, which is equal to its Secondary MCL.

Figure 4.3 and **Figure 4.4** show the sodium and chloride concentrations in groundwater samples collected from the monitoring wells from each aquifer. The sodium concentration in the groundwater samples collected from WT114A in October 2019 and October 2020 were greater than the GW RAOs. The concentration of chloride was greater than the GW RAO in the October 2019 groundwater sample collected from WT114A. The exceedance of chloride is typical for monitoring well WT114A. All other sodium and chloride concentrations in Upper Aquifer groundwater samples were less than the GW RAOs. Monitoring well WT114A is cross gradient of the Site and is located adjacent to the John Weaver Parkway. The source of the sodium and chloride in the groundwater samples collected from WT114A is likely due to road salt applied to the adjacent roadway to treat winter road conditions.

Sodium and chloride concentrations in the S16 and S17 groundwater samples from the Intermediate and Lower Aquifers were less than the GW RAO.

The sodium and chloride results for the routine groundwater quality monitoring samples for this monitoring period are consistent with historic baseline groundwater monitoring results.

3 Recent Reports and Site Controls

This section provides descriptions about the final actions related to the removal of potable wells and connections to the city water service to ensure protection of the environment and human health and also the institutional controls that are in place to meet the requirements of the CD/ROD. All of the institutional controls and water connections have been completed and future discussions related to these topics will be provided as part of the Annual Institutional Control Certification Report.

3.1 Private Well Sampling Report (October 2018):

As documented in previous AGMR's, an arsenic plume is present in the Intermediate Aquifer and groundwater has been consistently confirmed flowing to the south. Samples from several groundwater monitoring wells routinely contain arsenic at concentrations greater than the GW RAO of 10 µg/L. While arsenic was not placed in the landfill, it does naturally occur in the soil. As the landfill uses up oxygen in the groundwater, it creates favorable reducing conditions for the arsenic, thus making it present in the groundwater in variable concentrations at select locations. Previous detailed groundwater analyses concluded that arsenic concentrations in the groundwater have been relatively stable and do not pose a human health risk in these groundwater monitoring wells.

The Private Well Sampling Report (October 2018), detailed the historical and recent sampling events of nearby private wells. In September 2015, the Trust canvassed residences and businesses in the vicinity of the Intermediate Aquifer to determine the source of drinking water at

the properties (e.g., municipal water or private well) and to determine if there was a potential for the private wells to intercept the Intermediate Aquifer arsenic plume. During the 2015 visit, 23 properties were documented: private wells were confirmed on 12, municipal water was supplied to 7, and 4 unoccupied properties prevented official documentation of water supply. These properties represented the entire potential scope as previous review of water main records/maps indicated that municipal water supplies were already available and present south of Bristol Street, further southeast of the property.

Following a combined agency site-walk in October 2017 (USEPA, IDEM, and USACE), the Trust – in an effort to investigate, determine, and mitigate potential arsenic impacts – recommended that in lieu of installation of additional monitoring wells, a risk-based approach would be implemented by finalizing the door-to-door survey and sampling any remaining private wells.

With agency confirmation, the Trust conducted the final door-to-door survey to confirm the current private wells status for all properties. In July 2018, all properties were confirmed to either have eliminated private wells and/or maintain connection to the municipal water supply; there were 11 final/remaining properties confirmed to have private water supplies. Following receipt of owners' consent, sampling efforts commenced at these properties.

The 2018 private well results were all less than the arsenic GW RAO, with the exception of the sample collected from 1241 North Nappanee Street. This property is currently an auto sales lot consisting of a large parking lot, a sales trailer, and a connected garage and storage building, which contains a bathroom supplied by a private well (used for handwashing/sewage; bottled water is used for human consumption). In an effort to eliminate any risk from consumption, the Trust initiated coordination efforts with the property owner and funded the connection effort of the property to the available public water supply and abandon the well in conjunction with the required abandonment of the existing well on the property in compliance with 312 Indiana Administrative Code (IAC) 13-10-2.

In May 2019, the Trust completed the private well abandonment and connection to the municipal water supply for the property at 1241 North Nappanee Street (as documented in the Quarterly Report, June 2019).

Thus, there are no remaining potentially affected private wells which exceed the arsenic GW RAO.

3.2 Long-Term Stewardship Plan (April 2019):

The Institutional Controls Implementation and Assurance Plan (ICIAP) also known as the Long-Term Stewardship (LTS) Plan presents procedures to implement, maintain, and enforce institutional controls (ICs) at the Himco Site. It was originally submitted in December 2018 and finalized in April 2019, following conditional USEPA approval and amended modifications upon request.

The LTS Plan outlines the various controls enacted at the Site and the surrounding vicinity. As documented in the LTS Plan, the remedy selected for the landfill and associated parcels

surrounding the area entailed implementing ICs in the form of deed restrictions (or other appropriate institutional controls) which: prohibit both future groundwater use and future drilling or digging into the landfill cover; limit the land reuse to industrial, recreational, or commercial; abandoning any private well; and requiring feasibility studies to determine appropriate redevelopment scenarios, subject to USEPA/IDEM approval.

These ICs have been instituted on all affected parcels (both the landfill and off-Site) in the form of ERCs and DRs:

On-Site parcels: Land use restrictions are memorialized in ERCs signed by Bayer Healthcare LLC and Indiana Michigan Power filed with the Elkhart County Recorder. Four landfill parcels (D, F, Q, and S) – for which a signed ERC was in place – were transferred in January 2018 to Cooper Land Company of New Jersey Inc., an affiliate of Bayer HealthCare LLC. In 2018, Giada Holdings, LLC purchased Parcel J in a delinquent tax sale; this landfill parcel was formerly owned by Zap Distributing LLC and CLD Corporation. An ERC was signed for this parcel by Giada Holdings, LLC on December 18, 2019. A recorded Temporary Access Agreement also places some additional controls on the property. CLD Corporation currently owns a thin 1.38 acre parcel (that bisects Parcel J) and this parcel is subject to an ERC. Additionally, the Elkhart County Private Well Ordinance No. 2017-24 applies to the landfill property and all surrounding parcels and places further restrictions on the installation of any groundwater wells.

Off-Site Parcels: the remaining off-Site parcels (south, east, and west of the site) all have ERCs, with the exception of four parcels, for which a DR is in place.

The following four IC Instruments described below were selected as the mechanisms in which to assure compliance with the aforementioned remedies and ICs:

1. Annual Report: Per the Five Year Review (FYR), an Annual IC Monitoring, Compliance Assurance, and Certification Report (Annual Report) that will include a certification statement and results of IC reviews will be submitted to USEPA. It will demonstrate that the site was inspected to ensure no inconsistent uses have occurred, ICs remain in place and are effective, and any necessary contingency actions have been executed.
2. Quarterly Progress Reports: The Himco Trust will declare compliance with the ERCs in quarterly progress reports.
3. Well Verification: The Himco Trust will maintain compliance by verifying the absence of new groundwater drinking wells and changes in land use once during each FYR cycle and declare compliance in the Annual Report.
4. Land Restriction Verification: The Himco Trust will maintain compliance by verifying implemented land use restrictions via the Elkhart County Recorder's office (and current owners as needed) once during each FYR cycle and declare compliance in the Annual Report.

In summary, the Himco Trust has successfully completed all of the CD/ROD-required remedies at the site and implemented the prescriptive ICs. The most recent Annual IC Monitoring, Compliance Assurance, and Certification Report was submitted to IDEM and the USEPA on December 21, 2020. The remaining tasks currently ongoing at the Site include: soil gas monitoring, annual groundwater monitoring, inspections, routine Quarterly reports, and IC implementation/assurance.

4 Conclusions and Recommendations

4.1 Groundwater Elevation Monitoring

Data collected during S16 and S17 indicate that groundwater in the Upper, Intermediate, and Lower Aquifers typically flows south to southeast, consistent with the regional groundwater flow direction and previous monitoring data.

4.2 Groundwater Quality Monitoring

4.2.1 VOCs

Benzene was the only VOC detected at concentrations greater than its Primary MCL during the reporting period. Benzene concentrations that were greater than the GW RAO were detected in groundwater samples collected from only the Upper Aquifer monitoring wells WT115A and WT115B, located in the southeast corner of the landfill. Benzene results for this monitoring period are consistent with the historic benzene concentrations in groundwater samples collected from WT115A that range between 0.43 J μg/L through 16 μg/L and WT115B that range between 11 μg/L through 34 μg/L. These stable, low-level concentrations are consistent with a local source of benzene near WT115A and WT115B, which is defined to the south by monitoring wells WT122, WT106, and WT121. Benzene was not detected above the MCL in the samples collected from monitoring well WT115C. Monitoring well WT115C is screened in the Intermediate Aquifer and provides vertical delineation of the WT115 benzene plume.

1,1-DCA, cis-1,2-DCE, vinyl chloride, and carbon disulfide were detected in 13.6 percent to 50.8 percent of routine groundwater quality monitoring samples collected during the reporting period. Unlike the distinct benzene plume in the vicinity of WT115, these other VOCs were detected at concentrations that were significantly less than their respective GW RAOs. 1,1-DCA, cis-1,2-DCE, and vinyl chloride detections are clustered along the southern Site boundary. The broad distribution of low-level concentrations of degradation products and the lack of change in the distribution of VOCs over time is consistent with residual VOC groundwater contamination undergoing degradation.

Routine groundwater quality monitoring results for this reporting period (S16 and S17) are similar to each other and consistent with baseline (September 2011) monitoring data for VOCs.

4.2.2 Metals and General Chemistry Parameters

Arsenic, calcium, iron, lead, manganese, sodium, and chloride are the only metals and general chemistry parameters detected in groundwater samples at concentrations that exceeded their GW RAOs during this reporting period.

The GW RAO for arsenic is 10 μg/L, which is equal to its Primary MCL. During the S16 and S17 sampling events, the concentrations of arsenic ranged from 12 to 18 μg/L, which exceeds the GW RAO in four samples from Intermediate Aquifer monitoring wells WT114C and WT121B (located immediately east of the Site) and one sample from Upper Aquifer monitoring well WT121A (located southeast of the Site). The results are consistent with previous sampling events.

The arsenic concentrations in groundwater samples collected during this reporting period from Lower Aquifer monitoring well WT106C ranged from 9.4 to 12 μg/L, which is greater than the GW RAO of 10 μg/L. This is consistent with previous results.

There are detections of calcium in the Upper Aquifer defined by the GW RAO of 250,000 μg/L, which equals its RDA. Calcium concentrations in the Upper Aquifer that were greater than the GW RAO were detected in groundwater samples collected from Upper Aquifer monitoring wells WT115B and WT116A (located along the southern limit of waste). Calcium concentrations in groundwater samples from the Intermediate and Lower Aquifers were less than their GW RAOs.

There are detections of iron in the Upper Aquifer defined by the GW RAO of 26,000 μg/L. Iron concentrations in the Upper Aquifer that were greater than the GW RAO were detected in groundwater samples collected from Upper Aquifer monitoring wells WT114A (located east of the Site) and WT122A (located south of the Site). Iron concentrations in groundwater samples from the Intermediate and Lower Aquifers were less than their GW RAOs.

There are detections of lead in the Upper Aquifer defined by the GW RAO of 15 μg/L. Lead concentrations in the Upper Aquifer that were greater than the GW RAO were detected in the groundwater sample collected from Upper Aquifer monitoring well WT121A (located southeast of the Site) and WT116A (located south of the Site). Lead concentrations in all other groundwater samples and from the Intermediate and Lower Aquifers were less than their GW RAOs.

There is a plume of manganese in the Upper Aquifer defined by the 1,070 μg/L contour, which is its GW RAO derived from its BV. The manganese concentrations in groundwater samples collected from WT101A and WT116A, which are located along the southern limit of waste, were greater than the GW RAO. The maximum manganese concentrations in the Intermediate and Lower Aquifer well samples were 190 μg/L and 31 μg/L, respectively, which are less than the GW RAO. The GW RAOs for manganese are based on BVs, not health based criteria.

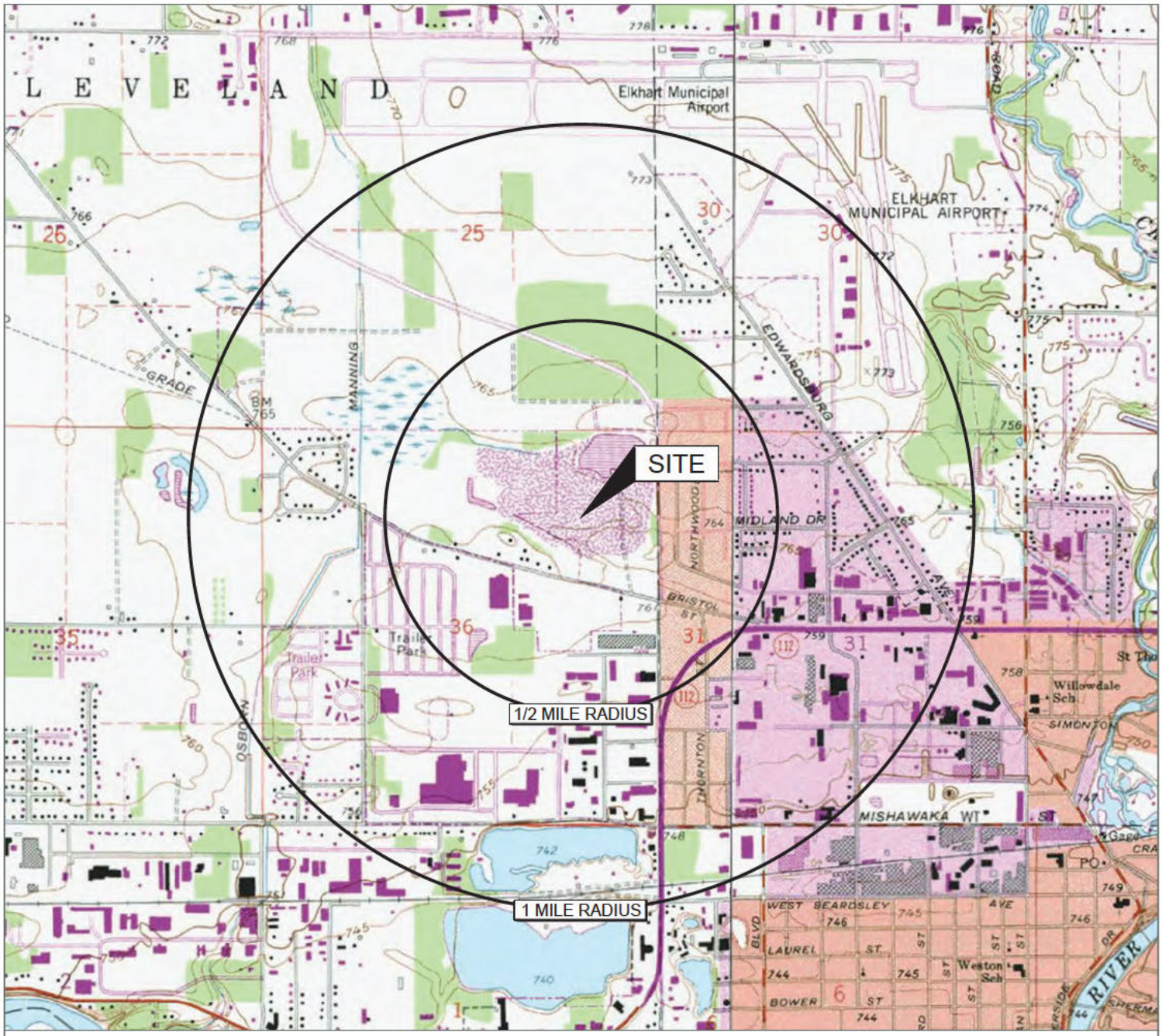
Sodium and chloride concentrations that were greater than the GW RAO were detected in groundwater samples from Upper Aquifer monitoring well WT114A. Monitoring well WT114A is cross gradient of the Site and located adjacent the John Weaver Parkway. The source of the sodium and chloride in the groundwater samples collected from WT114A are potentially linked to road salt applied to the adjacent roadway. Sodium and chloride are not Site-related COCs.

The metals and general chemistry data for S16 and S17 routine groundwater quality monitoring are consistent with baseline groundwater monitoring results from September 2011 and other previous monitoring data.

4.3 Future Monitoring and Reporting

Overall, the data from the two sampling events presented within this report reveal data consistent with historical trends with some reduction in concentrations. The PSDs will continue to follow the annual monitoring requirement and may perform further trend analysis at a later date to evaluate the current monitoring program. The PSDs continue to work with GES to compile the Addendum to the Construction Completion Report/Completion of Remedial Action Report (CRA-August 31, 2012) to assist EPA in initiating the *Final Close Out Report* (FCOR) and delisting for the Site.

Figures



Source:
USGS 7.5 Minute Series
Topographic Quadrangle, 1994
Osceola, Indiana
Contour Interval = 5 feet
Township - 38 N
Range - 4 E
Section - 36

Quadrangle Location
LAT. 041 ° 42 ' 23.81 " N
LONG. 086 ° 00 ' 25.95 " W
(Approximate Site Coordinates)

Site Location Map

The HIMCO Site Trust
HIMCO Landfill
County Road 10
Elkhart, Indiana

Drawn
W.A.W.
Designed
W.A.W.
Approved
J.E.H

Date
08/13/19
Figure
1

Scale In Feet
0 2000

Groundwater & Environmental Services, Inc.

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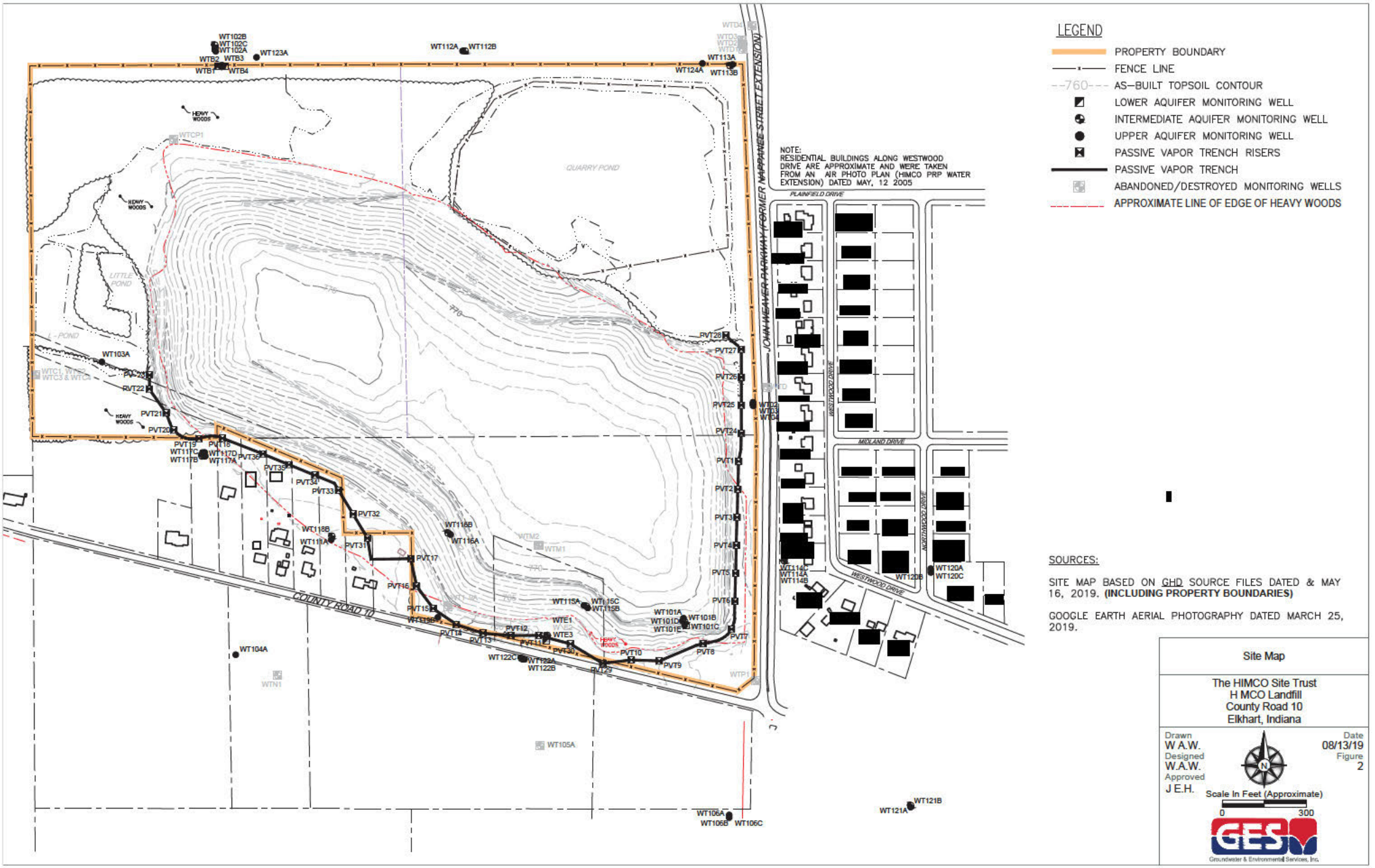

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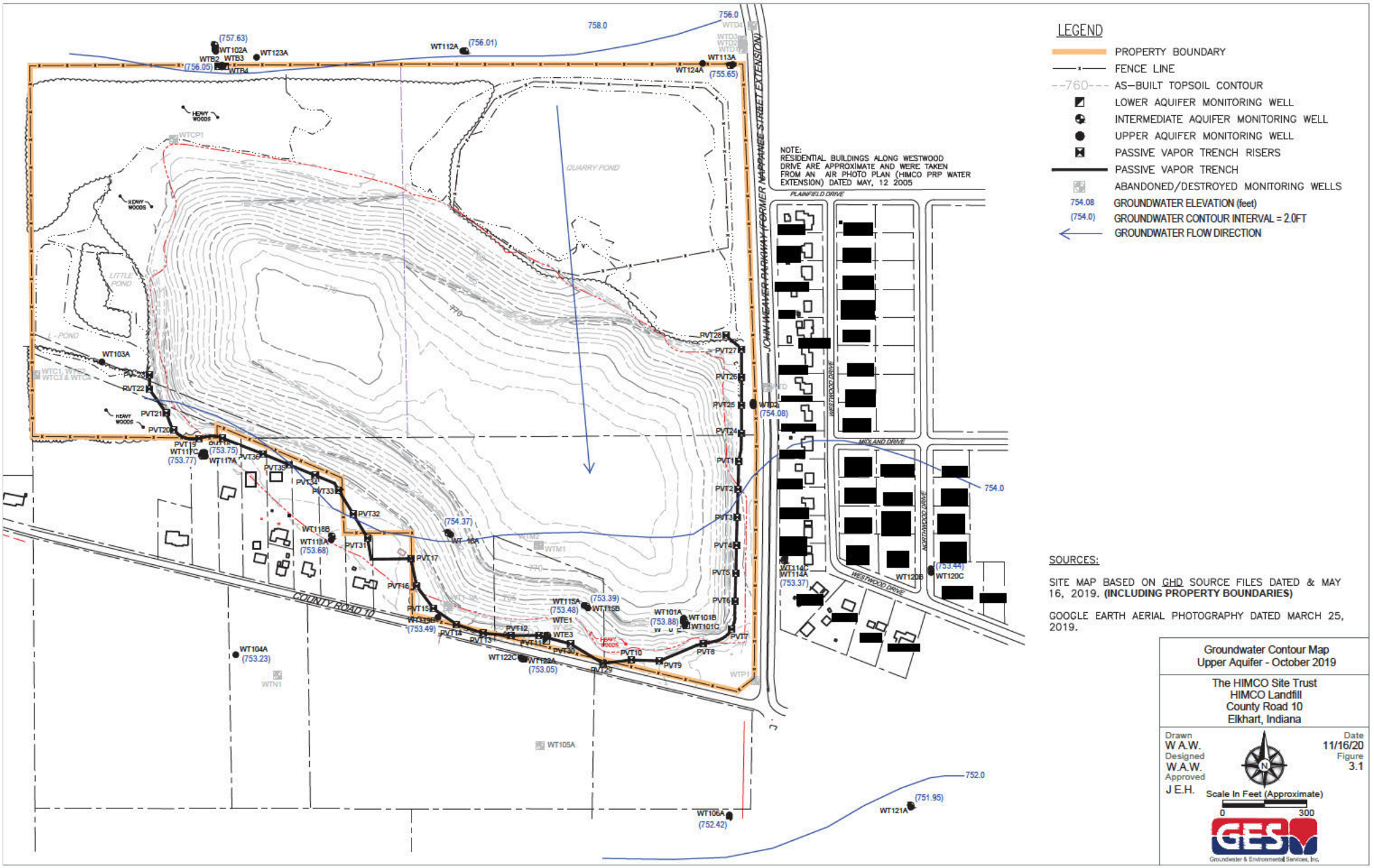

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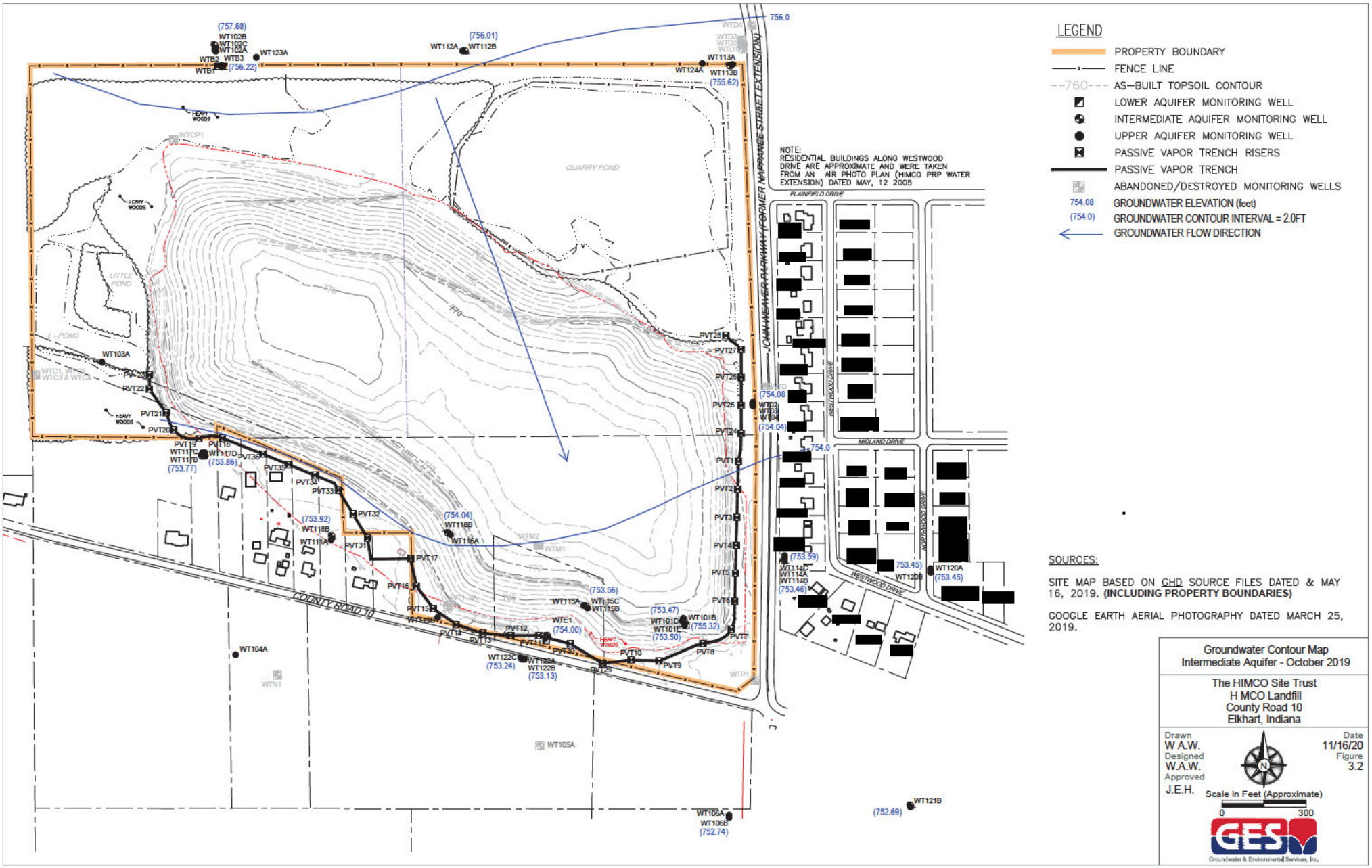

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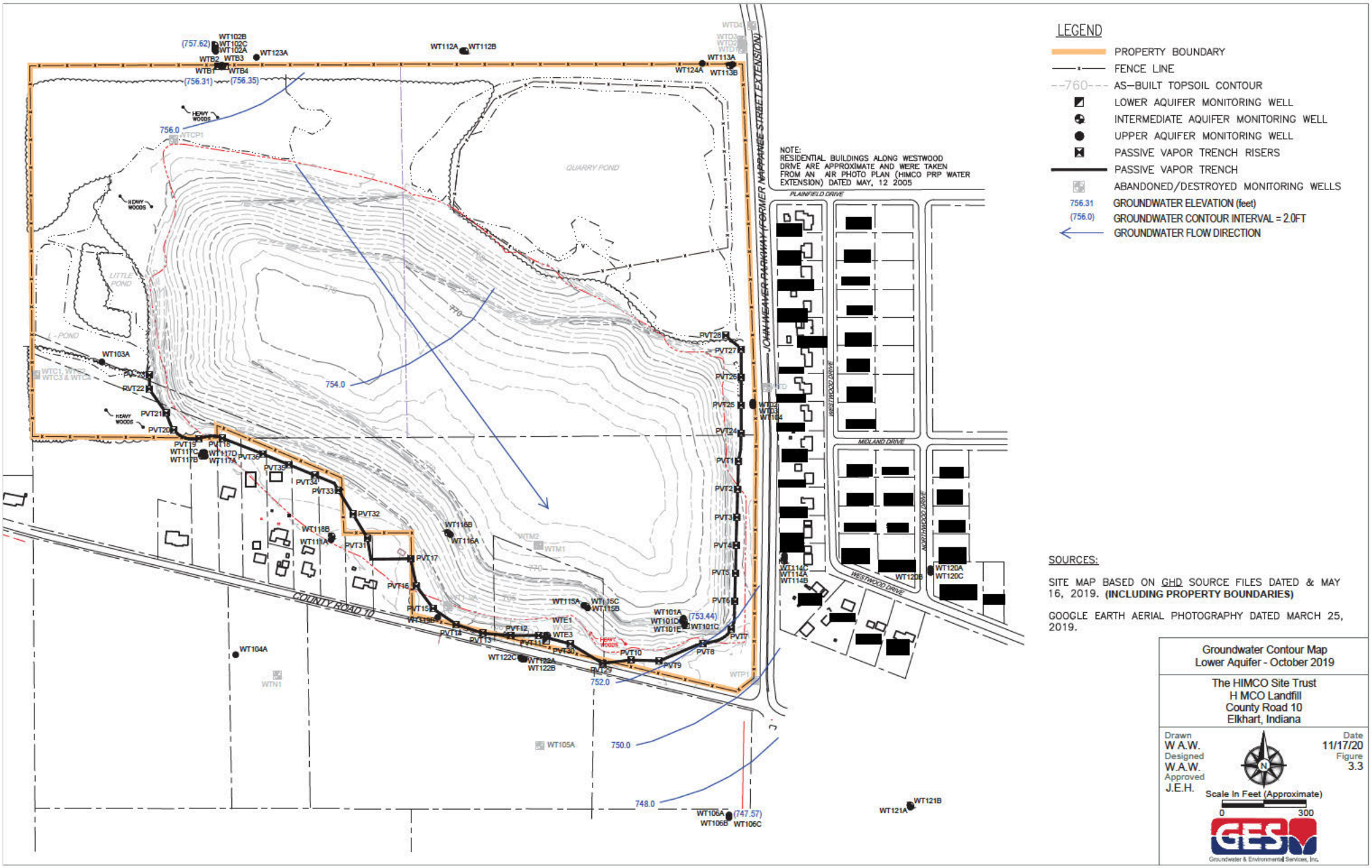

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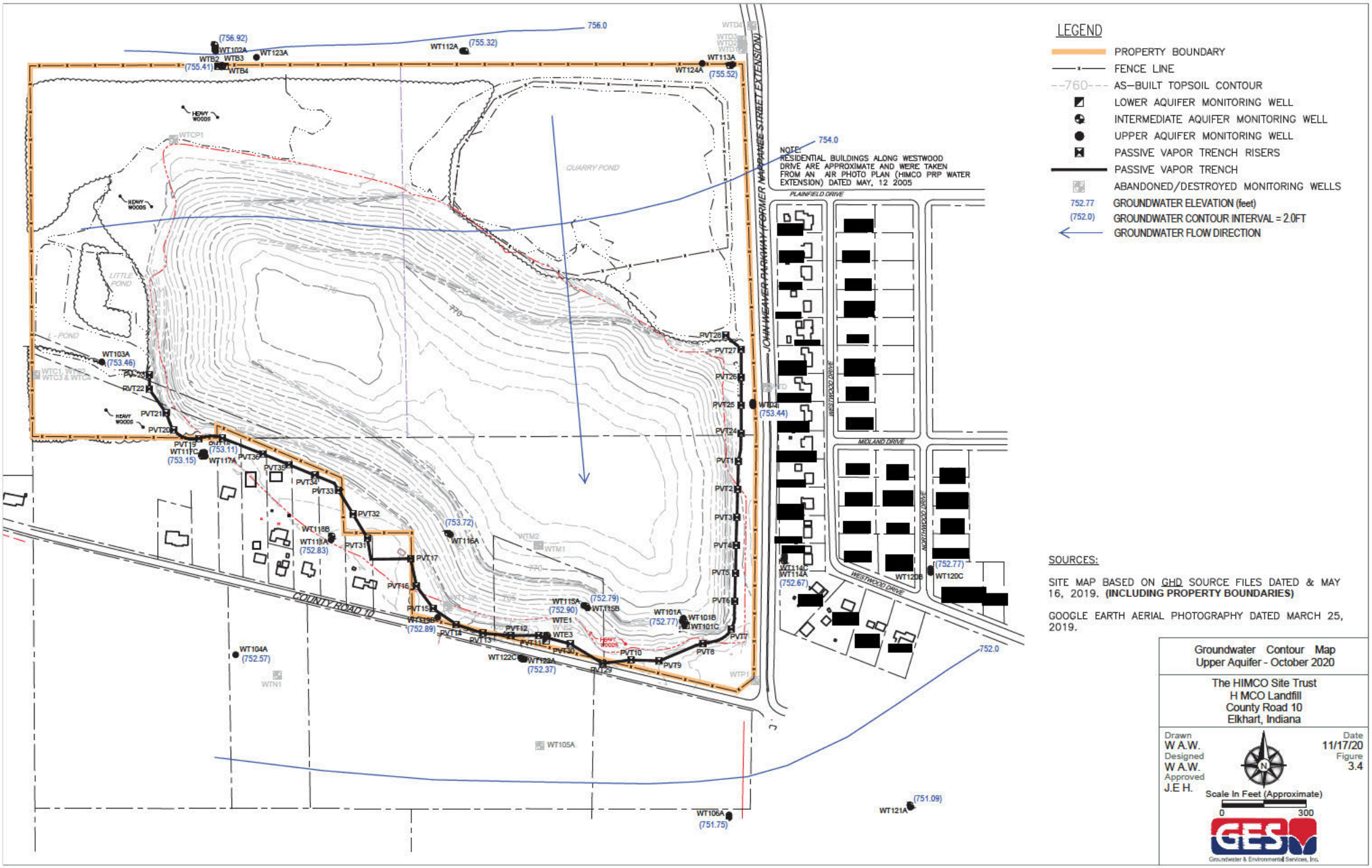

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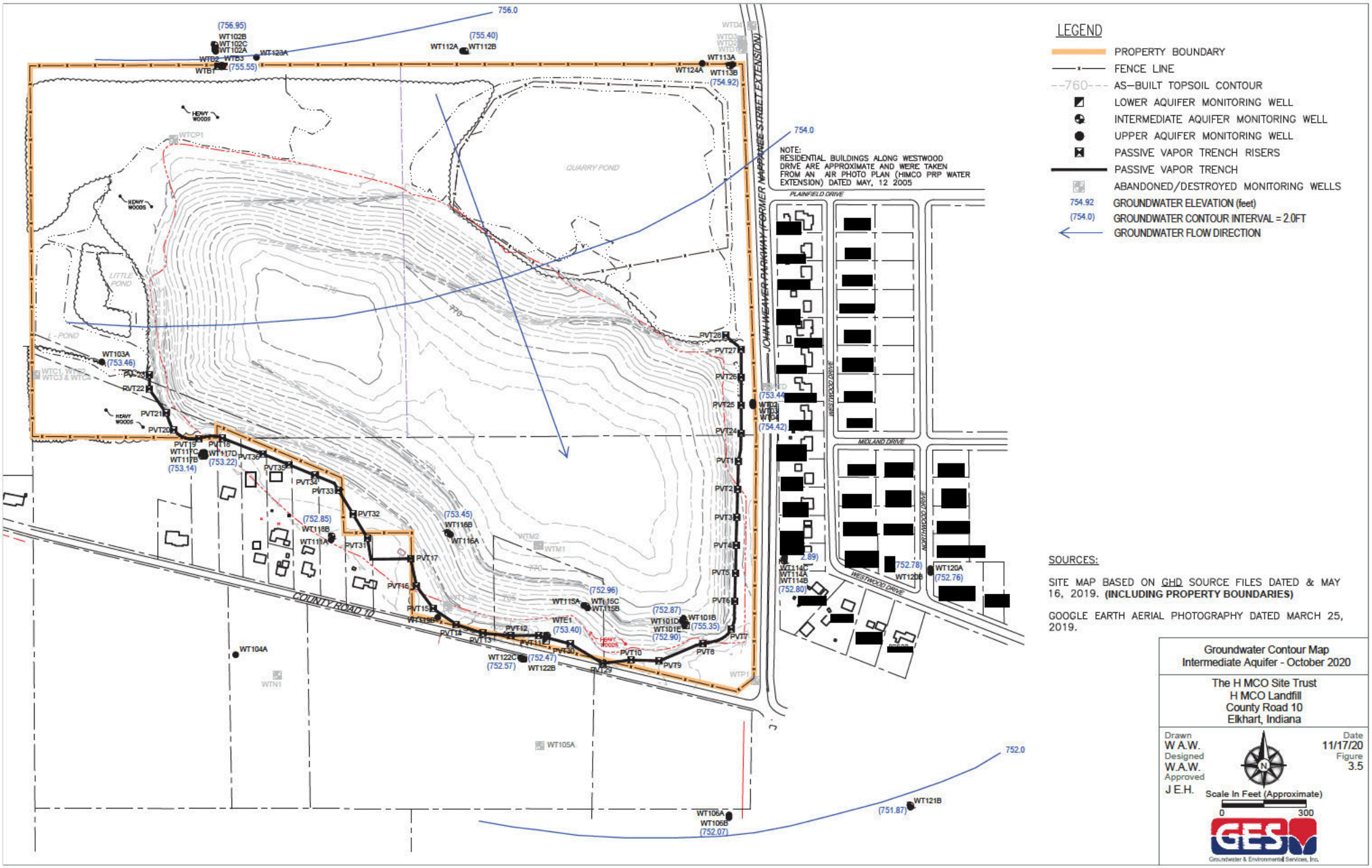

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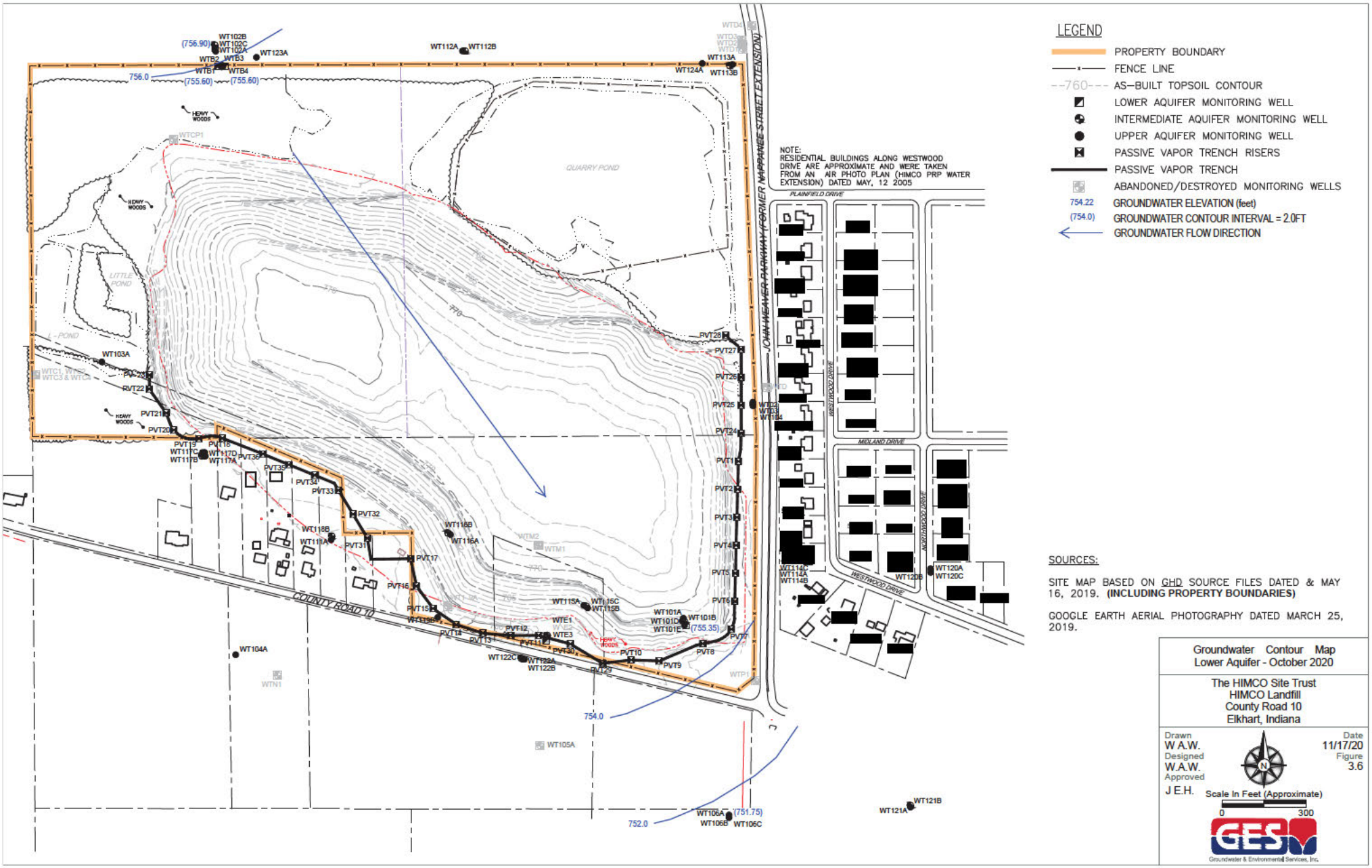

SOURCES:

SITE MAP BASED ON GHD SOURCE FILES DATED & MAY 16, 2019. **(INCLUDING PROPERTY BOUNDARIES)**

GOOGLE EARTH AERIAL PHOTOGRAPHY DATED MARCH 25, 2019.

Groundwater Contour Map
Lower Aquifer - October 2020

The HIMCO Site Trust
HIMCO Landfill
County Road 10
Elkhart, Indiana

Drawn W.A.W.
Designed W.A.W.
Approved J.E.H.
Date 11/17/20
Figure 3.6

Scale In Feet (Approximate)
0 300

GES Groundwater & Environmental Services, Inc.

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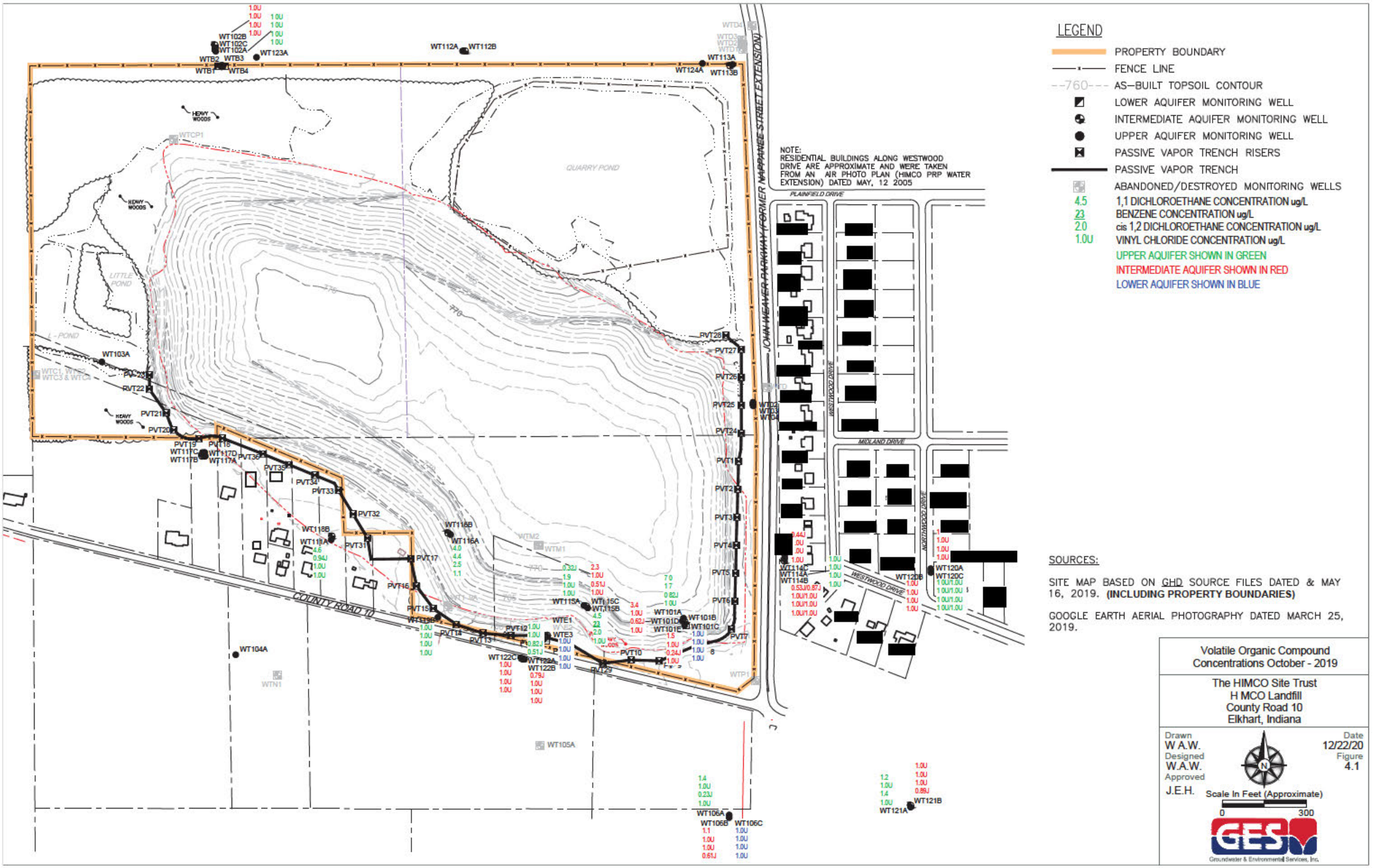

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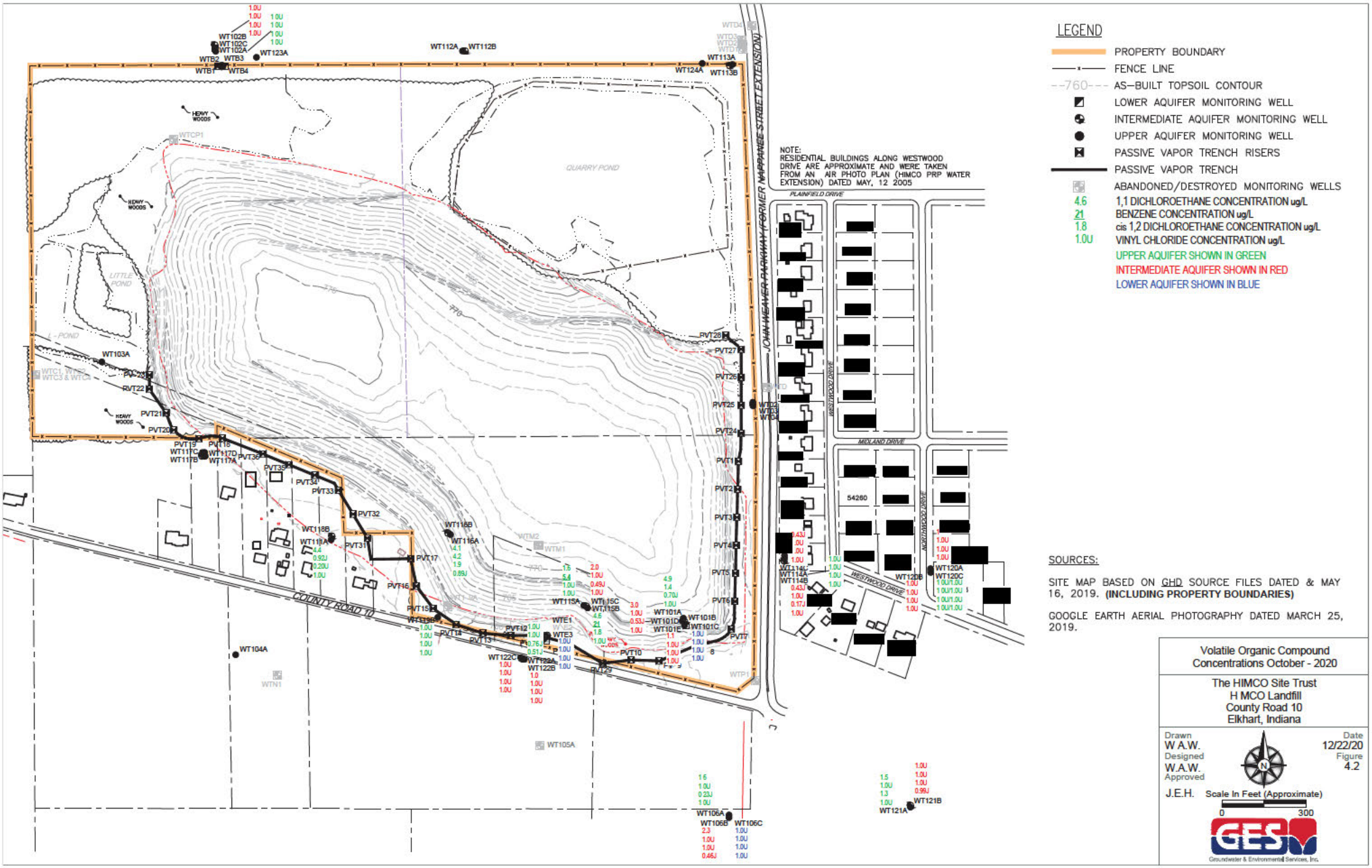

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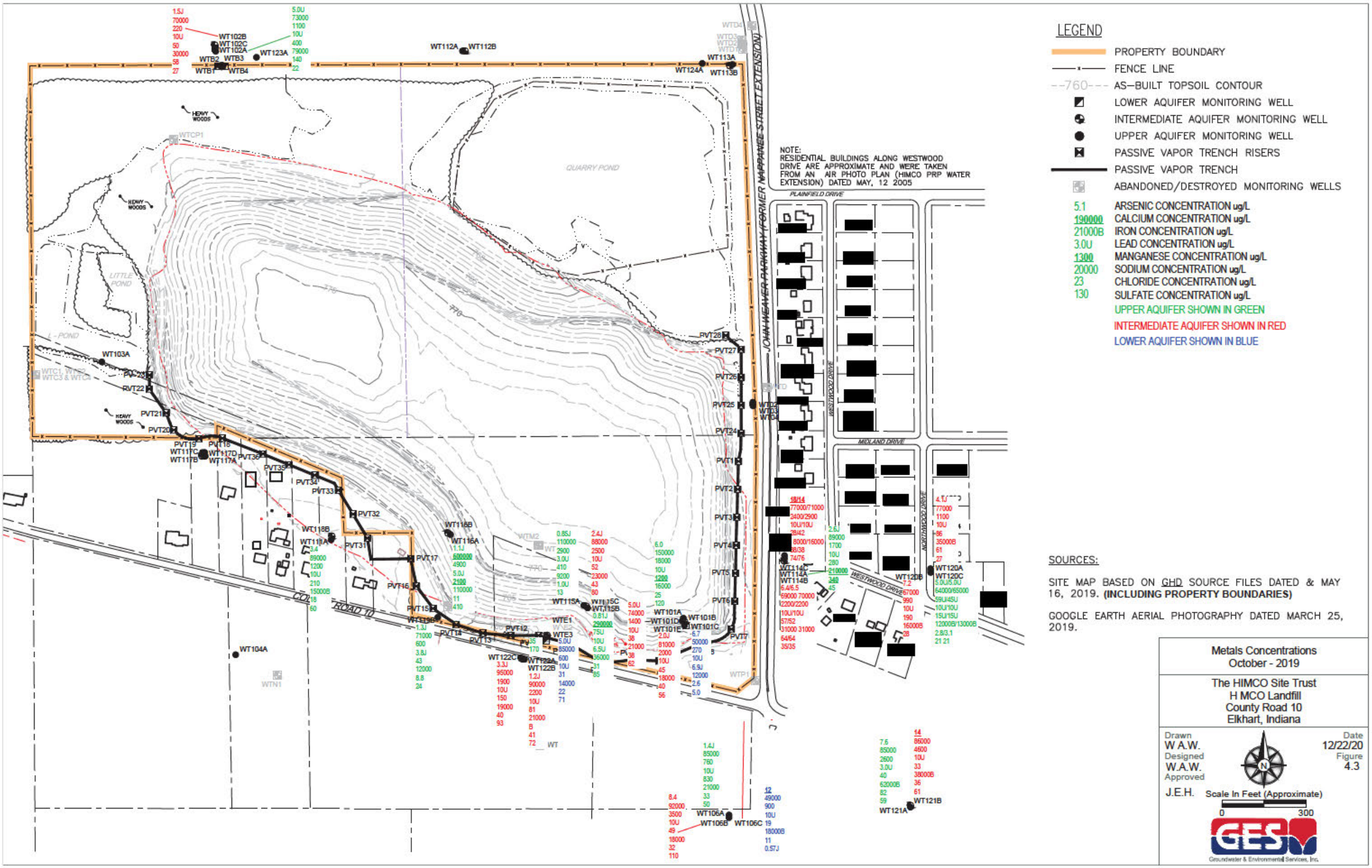

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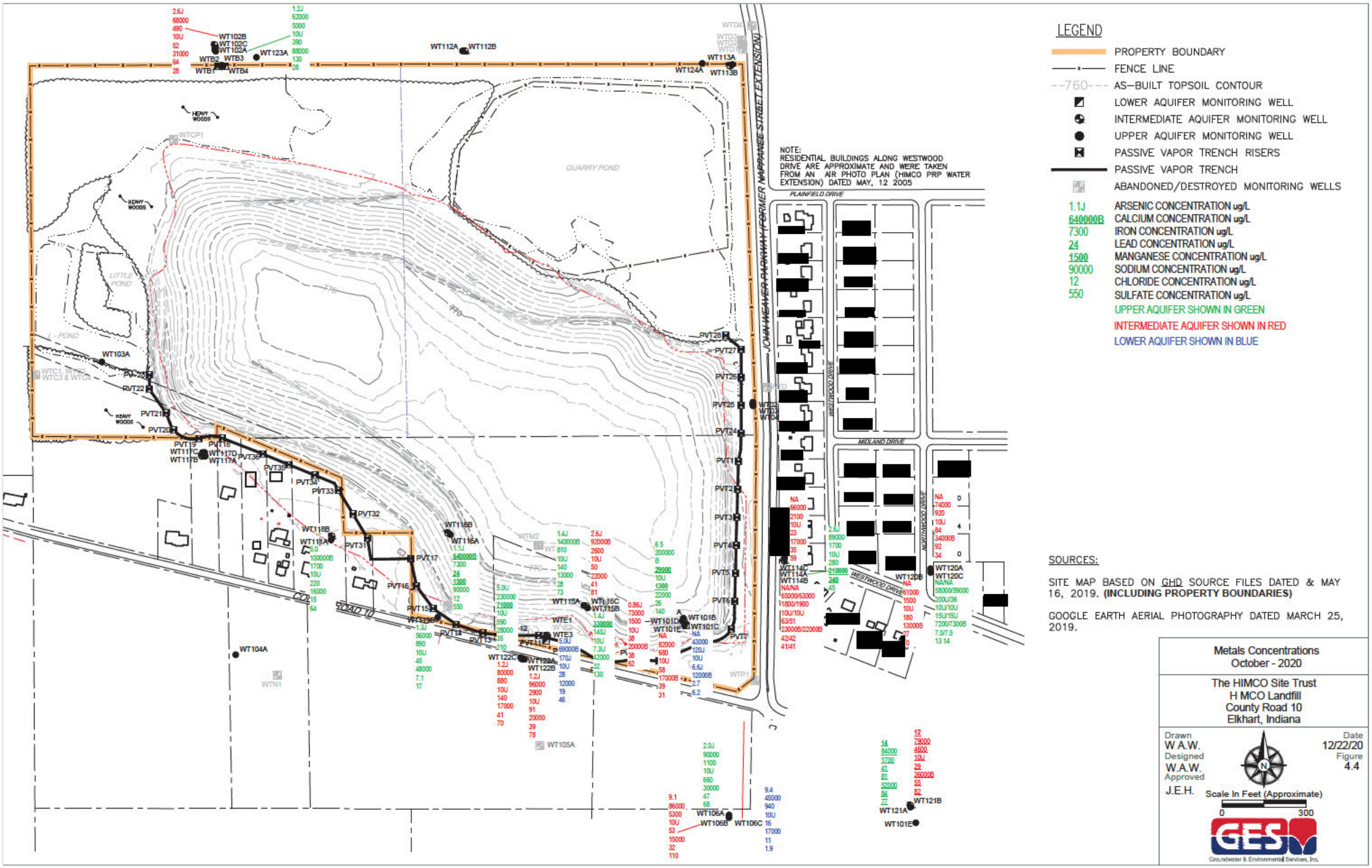

LEGEND

- PROPERTY BOUNDARY
- FENCE LINE
- --760--- AS–BUILT TOPSOIL CONTOUR
- LOWER AQUIFER MONITORING WELL
- INTERMEDIATE AQUIFER MONITORING WELL
- UPPER AQUIFER MONITORING WELL
- PASSIVE VAPOR TRENCH RISERS
- PASSIVE VAPOR TRENCH
- ABANDONED/DESTROYED MONITORING WELLS

1.1J	ARSENIC CONCENTRATION ug/L
640000B	CALCIUM CONCENTRATION ug/L
7300	IRON CONCENTRATION ug/L
24	LEAD CONCENTRATION ug/L
1500	MANGANESE CONCENTRATION ug/L
90000	SODIUM CONCENTRATION ug/L
12	CHLORIDE CONCENTRATION ug/L
550	SULFATE CONCENTRATION ug/L

UPPER AQUIFER SHOWN IN GREEN

INTERMEDIATE AQUIFER SHOWN IN RED

LOWER AQUIFER SHOWN IN BLUE

SOURCES:

SITE MAP BASED ON GHD SOURCE FILES DATED & MAY 16, 2019. **(INCLUDING PROPERTY BOUNDARIES)**

GOOGLE EARTH AERIAL PHOTOGRAPHY DATED MARCH 25, 2019.

Metals Concentrations
October - 2020

The HIMCO Site Trust
H MCO Landfill
County Road 10
Elkhart, Indiana

Drawn W.A.W.
Designed W.A.W.
Approved J.E.H.
Date 12/22/20
Figure 4.4

Scale In Feet (Approximate)
0 300

GES
Groundwater & Environmental Services, Inc.

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Appendix H – Annual IC Monitoring, Compliance Assurance and Certification Report

Groundwater & Environmental Services, Inc.

1737 Georgetown Road, Suite E
Hudson, OH 44236

T. 877.505.9382

December 21, 2020 Reference No. 039611

Director, Superfund Division
c/o Mr. William Murray
EPA Project Manager/Coordinator sent via email
U.S. Environmental Protection Agency (USEPA) Region 5 murray.williamj@epa.gov
77 West Jackson Boulevard
Chicago, Illinois 60604

Mr. John Matson
Associate Regional Counsel sent via email
U.S. Environmental Protection Agency (USEPA) Region 5 matson.john@epa.gov
77 West Jackson Boulevard
Chicago, Illinois 60604

Mr. Douglas Petroff
Senior Environmental Manager sent via email
Indiana Department to Environmental Management (IDEM) dpetroff@idem.in.gov
Federal Programs
MC 66-31, Room 1101
100 N. Senate Avenue
Indianapolis, Indiana 46206-6015

Re: Annual IC Monitoring, Compliance Assurance, and Certification Report
Himco Dump Site, Elkhart, Indiana (Site)

Dear: Director, Mr. Murray, Mr. Matson, and Mr. Petroff:

This report is submitted by Groundwater & Environmental Services, Inc. (GES) on behalf of the Performing Settling Defendants (PSDs), collectively known as the Himco Site Trust (the Trust).

In accordance with the provisions contained within the USEPA-approved Institutional Controls Implementation and Assurance Plan (Plan) also known as the Long-Term Stewardship (LTS) Plan and the First Five-Year Review Report for the Himco Dump Superfund Site (March 1, 2016), the Trust hereby declares annual compliance with the Institutional Controls (IC) Maintenance Elements and the Environmental Restrictive Covenant in place on the landfill property.

In addition, GES has contacted the Elkhart Utilities Department, Public Works Office, and County Recorder's office to validate property ownership, drinking water well status, and property zoning. All properties with ICs in place have been validated to show no change in zoning and no groundwater drinking wells have been installed on the subject properties. An updated "Himco Site

Property Ownership & Institutional Controls" table (**Table 1**) has been provided to document this information as well as any property changes that were noted during the IC research.

Annual Certification Statement:

As documented in quarterly reports submitted in Reporting Year 2020 (RY2020), the Site was inspected during sampling events; all ICs remain in place and effective at the Site; no inconsistent uses have occurred; no land use proposals have been made and no drilling or excavation has occurred that are not in conformance with the Consent Decree; and no contingency actions were necessary.

As outlined in the Plan, the Himco Trust has documented compliance with:

- the Elkhart's Public Works and Utilities Department that no groundwater drinking wells have been installed in the affected locations; and
- the Elkhart County Recorder's Office that property ownership and zoning are unchanged.

The Himco Trust continues to maintain compliance with the Plan.

Himco Representative: Randall Cooper, P.E.

Certification Signature 

Date: 12/22/20

Should you have any questions on the above, please do not hesitate to contact us.

Sincerely,

GROUNDWATER & ENVIRONMENTAL SERVICES, IINC.

Stephen E. Betts
Senior Project Manager
sbetts@gesonline.com
(877) 505-9382 x 4276

cc: Randall Cooper, Bayer Corporation (via e-mail)
Chintan Amin, Bayer Corporation (via email)
Jennifer Simon, Kazmarek Mowrey Cloud Laseter LLP (via email)

Institutional Control Table

TABLE 1
HIMCO SITE PROPERTY OWNERSHIP & INSTITUTIONAL CONTROLS ELKHART, INDIANA

No.	Address (CD Parcel)	Tax Identification Number	Current Property Owner	IC Instrument	Previous Property Owner (if applicable) prior to LTS Plan 2020 Elkhart County Search	Sale Date
	Landfill Parcels					
1	Consent Decree Parcel C	01-36-226-001-006	Bayer Healthcare LLC	ERC 7/30/13		
2	Consent Decree Parcel D, F, Q, & S	01-36-251-015-005; 01-36-276-003-005; 01-36-251-013-005; 01-36-276-001-006	*Cooper Land Company of New Jersey, Inc. (an affiliate of Bayer Healthcare LLC)*	ERC 1/15/09		
3	Consent Decree Parcel G	01-36-276-004-006	Indiana Michigan Power	ERC 3/24/08		
4	Consent Decree Parcel J	01-36-201-001-005	Giada Holdings, LLC	ERC 12/18/19	Zaps Distributing	11/2018
5	Thin Parcel bisecting J ("FF")	01-36-201-002-005	Wells Fargo Trustee for CLD Corporation	ERC 2/28/18		
	Residential Parcels					
1	[redacted]			ERC 12/3/09		
2				ERC 4/2/09		
3				ERC 12/3/09		
4				ERC 12/3/09		
5				ERC 11/11/09		
6				ERC 11/10/09		
7				ERC 12/3/09	[redacted]	4/2016
8				ERC 2/29/08		
9				DR 4/25/18		
10				ERC 12/3/09		
11				ERC 12/3/09		12/2020
12				ERC 12/3/09		
13				ERC 12/3/09		4/2019
14				ERC 12/3/09		
15				ERC 2/29/08		
16				ERC 1/15/09		
17				ERC 2/3/09		2/2020
18				ERC 2/29/08		4/2018
19				ERC 2/29/08		
20				ERC 1/31/08		
21				ERC 9/4/08		7/2009
22				ERC 2/29/08		11/2013
23				ERC 9/4/08		12/2018
24				ERC 2/29/08		
25				ERC 2/29/08		
26				ERC 2/29/08		10/2015
27				ERC 2/29/08		
28				ERC 2/29/08		
29				ERC 2/29/08		
30				ERC 2/29/08		
31				ERC 12/3/09		9/2016
32				ERC 9/4/08		5/2016
33				ERC 9/4/08		
34				ERC 12/3/09		7/2010
35				ERC 7/28/09		6/2014
36				ERC 11/27/07		3/2015
37				ERC 2/29/08		
38				ERC 2/29/08		
39				ERC 2/29/08		5/2020
40				ERC 2/29/08		
41				ERC 2/29/08		9/2020
42				ERC 3/24/08		
43				ERC 2/29/08		4/2013
44				ERC 3/24/08		
45				DR 4/25/18		1/2018
46				DR 4/25/18		
47				ERC 4/6/16		6/2016
48				DR 4/25/18		
49				ERC 2/1/18		

Notes:
1 Engineering Controls for the landfill have been met by providing appropriate soil cover, vegetation, drainage control, and soil gas venting.
2 Engineering Controls for all affected private property owners have been implemented via connection to municipal water supply and abandoning private wells.
3 Cleanup objectives include meeting MCLs for groundwater contaminants including arsenic, benzene, chloroform, 1,2-DCA(EDC), 1,2-DCP, vinyl chloride, calcium, iron, manganese, sodium, sulfate, 1,1-DCA, and cis-1,2-DCE.
4 Properties without Environmental Restrictive Covenants (ERC) were subject to Deed Restrictions (DR) implemented on April 25, 2018.
5 ERCs & DRs memorialize the Institutional Controls (IC), which are sumarized below

Institutional Controls	Landfill Parcels	Residential Parcels
Prohibit activity that interferes with the	X	X
Prohibit groundwater use and installation of private wells.	X	X
Abandon private wells.		X
Prohibit digging/drilling into landfill cover.	X	
Limit reuse to industrial, recreational, or commercial.	X	

Appendix I – 2019 Annual Groundwater Monitoring Report

HIMCO Site Trust

2019 Annual Groundwater Monitoring Report

HIMCO Landfill

Elkhart, Indiana

November 19, 2019

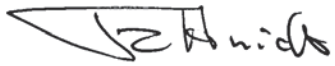
2019 Annual Groundwater Monitoring Report

HIMCO Landfill
Elkhart, Indiana

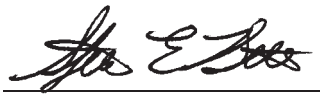
Prepared for:
HIMCO Site Trust
100 Bayer Road
Pittsburgh, PA 15205

Prepared by:
Groundwater & Environmental Services, Inc.
1737 Georgetown Road, Unit E
Hudson, Ohio 44236
TEL: (877 505-9382
www.gesonline.com

Date:
November 19, 2019



John E. Hnida
Geologist



Stephen E. Betts
Sr. Project Manager

David Cleland
Project Hydrogeologist

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Embedded Tables

Figures

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Appendices

Acronyms

5YR	Five Year Review
AGMR	Annual Groundwater Monitoring Report
AMSL	Above Mean Sea Level
BV	Background Value
CD	Consent Decree
CDA	Construction Debris Area
COCs	Chemicals of Concern
CRA	Conestoga-Rovers & Associates
DN	Deed Notices
DO	Dissolved Oxygen
ERC	Environmental Restrictive Covenants
FYR	Five Year Review
GES	Groundwater & Environmental Services, Inc.
GMP	Groundwater Monitoring Program
GW RAO	Groundwater Remedial Action Objective
GWSDAT	Groundwater Spatiotemporal Data Analysis Tool
IAC	Indiana Administrative Code
IC	Institutional Controls
ICIAP	Institutional Controls Implementation and Assurance Plan
IDEM	Indiana Department of Environmental Management
MAROS	Monitoring and Remediation Optimization System
mg/L	milligrams per liter
MCL	Maximum Contaminant Level
NPL	National Priority List
NTU	Nephelometric Turbidity Units
ORP	Oxidation Reduction Potential
PSDs	Performing Settling Defendants
QAPP	Quality Assurance Project Plan
RA	Remedial Action
Report	2019 Annual Groundwater Monitoring Report
RD	Remedial Design
RDA	Recommended Dietary Allowance
RDL	Reporting Detection Limit
RD/RA	Remedial Design/Remedial Action
RSL	Tapwater Regional Screening Level
Site	Himco Landfill Site
SOW	Statement of Work
µg/L	microgram per liter
UCL	Upper Confidence Limit
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

1 Introduction

This 2019 Annual Groundwater Monitoring Report (AGMR) presents the results of routine groundwater monitoring completed in October 2018 and April 2019 at the Himco Landfill Site (Site), located in Elkhart, Indiana. Groundwater and Environmental Services, Inc. (GES) has prepared this report on behalf of the Performing Settling Defendants (PSDs), collectively known as the Himco Site Trust.

The Site is a National Priorities List (NPL) site that is being remediated pursuant to a Consent Decree (Civil Action No. 2:07cv304 (TS)) (CD). The Statement of Work (SOW), included as Appendix B of the CD, specified the Remedial Action (RA) requirements for the Site. The SOW required groundwater investigations to the east and southeast of the Site and the implementation of a Groundwater Monitoring Program (GMP). GHD (formerly known as Conestoga Rovers & Associates [CRA]) prepared a Remedial Design Work Plan (RD Work Plan) on behalf of the PSDs that combined the East and Southeast Groundwater Investigations and the GMP into a three-phase groundwater investigation that built incrementally to address the groundwater investigation and monitoring requirements of the SOW.

GHD completed quarterly groundwater monitoring between 2008 and 2011. GHD documented the results of previous monitoring rounds in a series of reports previously submitted to the United States Environmental Protection Agency (USEPA) and the Indiana Department of Environmental Management (IDEM). In accordance with the Interim Groundwater Monitoring Program Report (CRA, 2011), approved by USEPA on August 31, 2011, the GMP currently includes semi-annual groundwater monitoring with annual reporting each fall. In April 2015 and August 2016, USEPA provided letters commenting on the 2014 and 2015 AGMRs, respectively. These letters authorized further reductions to the current twelve (12) parameters included in the GMP.

1.1 Background

The Site is a closed landfill located at the intersection of County Road 10 and North Nappanee Street in Cleveland Township, Elkhart County, Indiana. This former 60-acre unlined landfill, previously operated by Himco Waste Away Service, Inc., accepted waste including household refuse, construction rubble, medical waste, and calcium sulfate during its operation between 1960 and its eventual closure in 1976.

The Site was proposed for the NPL in 1988 and was placed on the NPL in 1990. The Remedial Design/Remedial Action (RD/RA) was conducted pursuant to the CD, which became effective on November 27, 2007. Currently, the Site is a grassy field secured by a chain-link perimeter fence.

A Site Location Map is supplied as **Figure 1**, showing the general location of the site and surrounding area. A Site Map is presented as **Figure 2**, graphically depicting the layout of the Site, property boundaries, monitoring wells and neighboring properties. The Site consists of two major areas: the landfill and the 4-acre construction debris area (CDA). The CDA is located on the northern portion of seven residential properties and one commercial property that front onto

County Road 10. In 2011, the PSDs relocated CDA waste to the landfill, and completed the construction of a soil cover over the landfill in 2012. USEPA approved the *Construction Completion Report/Completion of Remedial Action Report* (CRA, 2012) on October 31, 2012.

1.2 Previous Investigations

Section II, Paragraph 4.3 of the SOW describes the requirements for the groundwater investigation east and southeast of the Site. The purpose of the investigation was to delineate the contaminant plume emanating from the Site that may potentially be impacting the adjacent aquifer and private water supply wells.

The Himco Site Trust completed a USEPA-approved phased groundwater investigation from 2008-2012 consisting of:

- Historic data compilation
- Existing monitoring well reconnaissance and survey
- Baseline groundwater monitoring
- Vertical aquifer sampling
- The Interim Groundwater Monitoring Program

A detailed description of each report and the timing of USEPA's comments and approvals are presented in the 2014 AGMR.

1.2.1 Routine Groundwater Monitoring

GHD completed a Baseline Groundwater Sampling round in 2008. The purpose of this sampling was to determine if the existing monitoring wells were capable of providing representative groundwater samples and to establish baseline groundwater quality conditions. The Baseline Groundwater Sampling round represents the first routine quarterly groundwater quality monitoring round (Q1).

GHD completed the initial round of the Interim Groundwater Monitoring Program in February 2009. The Interim Groundwater Monitoring Program was completed on a quarterly basis between November 2008 and June 2011. GHD provided the results of the Interim Groundwater Monitoring Program to the USEPA in the following submissions:

- Q1 and Q2 - The Phase I Groundwater Investigation Report (CRA, May 2009)
- Q3 through Q6 - Himco Annual Groundwater Monitoring Report (CRA, July 2010)
- Q7 - The Phase II Groundwater Investigation Report (CRA, October 2010)
- Q8 - Interim Groundwater Monitoring Program Report (CRA, April 2011)
- Q9 through Q11 – 2011 Annual Groundwater Monitoring Report (CRA, November 2011)
- Q12 and Q13 – 2012 Annual Groundwater Monitoring Report (CRA, November 2012)

GHD completed the initial round of the semi-annual GMP (S1) in April 2012. The results of the S1 monitoring were provided in the 2012 Annual Groundwater Monitoring Report

(CRA, November 2012). The subsequent rounds of the GMP and the corresponding reports are as follows:

- S2 and S3 – 2013 Annual Groundwater Monitoring Report (CRA, November 2013)
- S4 and S5 – 2014 Annual Groundwater Monitoring Report (CRA, November 2014)
- S6 and S7 – 2015 Annual Groundwater Monitoring Report (GHD, November 2015)
- S8 and S9 – 2016 Annual Groundwater Monitoring Report (GHD, November 2016)
- S10 and S11– 2017 Annual Groundwater Monitoring Report (GHD, November 2017)
- S12 and S13 – 2018 Annual Groundwater Monitoring Report (GHD, November 2018)

GHD completed the 14th round and GES completed the 15th round of the semi-annual GMP (S14 and S15) from October 22 to 25, 2018 and April 22 to 25, 2019, respectively. The results of the S14 and S15 monitoring rounds are provided in this AGMR.

1.3 Report Organization

This report is organized as follows:

- Section 2 Describes the scope of the routine groundwater monitoring activities completed at the Site during the two most recent biennial events (10/2018 and 4/2019). The description includes hydrogeologic model, the groundwater flow regime, and presents hydraulic monitoring data.
- Section 3 Reviews information on recent reports and site controls.
- Section 4 Discusses the statistical trend analysis of sampling data since 2012 for the parameters accepted by USEPA and IDEM utilizing the programs that were agreed upon by USEPA and IDEM.
- Section 5 Presents conclusions and outlines future routine groundwater monitoring activities.

2 Groundwater Gauging, Sample Collection, and Results

2.1 Site Hydrogeology

There are five principal hydrostratigraphic units beneath the Site. They are, in descending order:

- The Upper Aquifer
- The Intermediate Aquifer
- The Unnamed Silt/Clay Layer
- The Lower Aquifer
- The Bedrock

The Upper and Intermediate Aquifers beneath the Site have been conceptualized as one sand aquifer with silt/clay aquitard materials occasionally interspersed. The sand comprising the Intermediate Aquifer is generally more fine-grained than the overlying Upper Aquifer and it contains discontinuous zones of silt and clay.

The Unnamed Silt/Clay Layer underlies the Intermediate Aquifer and does not behave as a confining layer.

The sand and gravel Lower Aquifer is beneath the Unnamed Silt Clay layer. The elevation of the Bedrock surface beneath the Site is variable, and therefore, so is the thickness of the Lower Aquifer, but it ranges up to 300 feet thick in the bedrock valley beneath the western portion of the Site. **Figure 3** presents a Conceptual Hydrogeologic Site Model.

2.2 Groundwater Elevation Monitoring

Two synoptic groundwater elevation monitoring rounds were conducted during this reporting period on October 22, 2018 (S14), and April 22, 2019 (S15). **Table 3.1** provides the depth to water and groundwater elevation measured at each monitoring well during the water level rounds and during any subsequent groundwater sampling.

Figure 4.1, **Figure 4.2**, and **Figure 4.3** present groundwater elevation contours derived from groundwater elevation data collected on October 22, 2018 for the Upper Aquifer, Intermediate Aquifer and Lower Aquifer, respectively. **Figure 4.4**, **Figure 4.5**, and **Figure 4.6** present groundwater elevation contours derived from groundwater elevation data collected on April 22, 2019 for the Upper Aquifer, Intermediate Aquifer and Lower Aquifer, respectively. The depth to groundwater near the Site is relatively shallow, with typical depths ranging from 4.18 to 15.57 feet. The elevation of groundwater near the Site ranges from approximately 748.13 to 758.91 feet above mean sea level (AMSL).

Figures 4.1 and 4**.4** show that groundwater in the Upper Aquifer typically flows in a southerly direction. Overall groundwater flow is to the south and is consistent with the regional groundwater flow pattern. The horizontal hydraulic gradient in the Upper Aquifer calculated to 0.00120 feet/feet for the October 2018 event and 0.00118 feet/feet for the April 2019 event.

As shown on **Figures 4.2** and 4**.5**, groundwater in the Intermediate Aquifer typically flowed in a southerly direction in October 2018 and April 2019, consistent with the regional groundwater flow pattern. East and southeast of the southeast corner of the Site, groundwater in the Intermediate Aquifer flows south. The horizontal hydraulic gradient in the Intermediate Aquifer calculated to 0.00105 feet/feet for the October 2018 event and 0.00105 feet/feet for the April 2019 event.

Figures 4.3 and **4.6** show a south-southeasterly groundwater flow direction in the Lower Aquifer in October 2018 and April 2019. The horizontal hydraulic gradient in the Lower Aquifer calculated to 0.00221 feet/feet for the October 2018 event and 0.00225 feet/feet for the April 2019 event.

2.3 Groundwater Quality/Results

This section of the 2019 AGMR describes the groundwater quality in the vicinity of the Site and discusses the nature and extent of groundwater contamination emanating from the Site.

This 2019 AGMR presents groundwater quality monitoring data for two semi-annual monitoring events, the S14 and the S15 rounds of the GMP that were completed in October 2018 and April 2019, respectively. **Table 4.1** provides the final readings of the stabilization parameters

measured in the field during the S14 and S15 monitoring rounds. Groundwater analytical reports are provided as **Appendix A** and field notes are provided as **Appendix B**.

The following analytes are included in the GMP at the Site:

Volatile Organic Compounds (VOCs)

- Benzene
- 1,1-Dichloroethane (1,1-DCA)
- cis-1,2-Dichloroethene (cis-1,2-DCE)
- Vinyl chloride

Metals

- Arsenic
- Calcium
- Iron
- Lead
- Manganese
- Sodium

General Chemistry

- Sulfate
- Chloride

The following sections discuss the results of the S14 and S15 GMP rounds.

2.3.1 Field Parameters

Groundwater samples were collected after consistent pH, temperature, conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP) and turbidity measurements were obtained. **Table 4.1** provides the final stabilized value for each field parameter.

DO and ORP values are generally low and negative, respectively, near a landfill because of reducing groundwater conditions generated in the landfill. This can locally increase metals solubility, and mobility, until oxidizing conditions are encountered and the metals precipitate. Excessive turbidity can also artificially elevate metals concentrations in groundwater samples. This is generally an artifact of the sampling process and does not reflect actual concentrations of metals dissolved in, and transported via groundwater.

2.3.2 Volatile Organic Compounds (VOCs)

A total of 58 groundwater samples from 27 monitoring wells (27 samples and 2 duplicates X 2 events), were collected and analyzed for VOCs. The laboratory analytical results are summarized in **Table 1.1** and monitoring wells with detectable concentrations are depicted on **Figure 5.1** and **Figure 5.2**.

Benzene was the only VOC detected in routine groundwater monitoring samples at concentrations greater than its Primary Maximum Contaminant Level (MCL) (5 micrograms per liter [µg/L]). The four VOCs in the GMP parameter list were detected at the following frequencies:

- Benzene = 13.8 percent
- 1,1-DCA = 50.0 percent
- cis-1,2-DCE = 34.5 percent
- Vinyl chloride = 12.1 percent

The following is a summary of the frequency of detection of the VOCs in each aquifer for the October 2018 and April 2019 groundwater quality monitoring results:

Table 1 – Number of VOC Detections/Number of Samples

Parameter	Upper Aquifer	Intermediate Aquifer	Lower Aquifer
Benzene	8/26	0/26	0/6
1,1 DCA	13/26	16/26	0/6
cis- 1,2-DCE	11/26	9/26	0/6
Vinyl chloride	3/26	4/26	0/6

2.3.3 Benzene

As shown in **Table 4.2**, benzene was detected in eight of 58 groundwater samples collected from the monitoring well network during this reporting period, or 13.8 percent of the groundwater samples. The detected concentrations of benzene ranged from 0.18 J[1] µg/L to 16 µg/L. **Figure 5.1** and **Figure 5.2** depict routine groundwater quality monitoring results for monitoring wells with detectable concentrations of benzene for the S14 and S15 events.

The concentration of benzene was greater than the Primary MCL of 5 µg/L in both of the groundwater samples collected from Upper Aquifer monitoring well WT115B during the monitoring period. As shown on **Figure 5.1**, monitoring wells WT115A and WT115B are Upper Aquifer monitoring wells located in the southeast corner of the Site, near the limit of waste. The historic benzene results for routine groundwater monitoring samples collected from WT115A (Upper Aquifer), WT115B (Upper Aquifer), and WT115C (Intermediate Aquifer) were as follows:

[1] J = the concentration is estimated

Table 2 – WT115A/B/C Benzene Concentrations

Date	WT115A	WT115B	WT115C
11/6/2008	5.7/9.3	Not Installed	Not Installed
2/12/2009	12	Not Installed	Not Installed
5/6/2009	1.0 U/0.43 J	Not Installed	Not Installed
8/5/2009	9.9	Not Installed	Not Installed
11/6/2009	12/12	Not Installed	Not Installed
3/2/2010	9.8	Not Installed	Not Installed
6/17/2011	0.69 J	Not Installed	Not Installed
9/15/2010	10	Not Installed	Not Installed
12/13/2010	16	Not Installed	Not Installed
3/11/2011	3.6	30	1.0 U
6/22/2011	1.0 U	29	1.0 U
9/20/2011	2.9	11	1.0 U
12/14/2011	Not Sampled	34	Not Sampled
4/26/2012	1.0 U	30	1.0 U
9/20/2012	16	31	Not Sampled
4/25/2013	1.0 U/1.0 U	32	1.0 U
9/24/2013	7	22	1.0 U
4/24/2014	1.0 U	23	1.0 U
9/25/2014	1.0 U	31/31	1.0 U/1.0 U
5/7/2015	1.0 U	21	1.0 U
9/24/2015	1.1	18	1.0 U
4/28/2016	1.0 U	21/22	1.0 U
10/5/2016	1.0 U	19/18	1.0 U
4/12/2017	1.0U	12	1.0U
9/27/2017	18	12	1.0 U
4/27/2018	1.0 U	13	1.0 U
10/25/2018	1.9	16	1.0 U
4/24/2019	1.0 U	15	1.0 U

Notes:
All laboratory data is reported in micrograms per liter
5.7/9.3 Duplicate sample result
J Estimated concentration
U Not-detected at the associated value

Benzene was also detected in groundwater monitoring samples collected from three other monitoring wells during S14 and S15 groundwater quality monitoring rounds, as follows:

Table 3 – S14 and S15 Benzene Detections

Well	Number of Detections/ Number of Samples	Range of Benzene
WT101A	2/2	0.18 J – 5.7
WT111A	1/2	0.54 J – 1.5
WT116A	2/2	1.3 – 2.7

Note:
All laboratory data is reported in micrograms per liter
J Estimated concentration

All five of the wells where benzene was detected are in the Upper Aquifer. As shown on **Figure 5.1**, these Upper Aquifer monitoring wells are located along the southern limit of waste. Therefore, the Upper Aquifer benzene plume does not extend off Site.

Benzene was not detected above the RDL of 1.0 µg/L in any groundwater samples collected from Intermediate or Lower Aquifer monitoring wells during S14 and S15.

The pattern of low concentrations of benzene dissolved in Upper Aquifer groundwater along part of the southern edge of the landfill is consistent with a relatively weak local source of benzene near WT115A and WT115B. Benzene results for this monitoring period are consistent with the historic benzene concentrations in groundwater samples collected from WT115B that range between 11 µg/L and 34 µg/L. Benzene concentrations in groundwater samples from WT115A prior to 2014 fluctuated between less than 1 µg/L to 16 µg/L. Beginning in 2014, benzene has only been detected in three of 11 groundwater samples. The concentration of 18 µg/L in the September 2017 groundwater sample was the maximum observed to date. However, the data from the April 2018 event through the most recent event in April of 2019 (three sampling events) are below the MCL.

2.3.4 1,1-Dichloroethane (1,1-DCA)

As summarized in **Table 4.2**, 1,1-DCA was detected in 29 of 58 routine groundwater samples collected from the monitoring well network during this reporting period, or 50.0 percent of the samples. The concentrations of 1,1-DCA ranged from 0.41 J µg/L to 6.8 µg/L. There is no MCL for 1,1-DCA. USEPA requested that the Himco Site Trust compare 1,1-DCA results to the calculated Tapwater Regional Screening Level (RSL) of 240 µg/L, which is based on an excess cancer risk of 1×10^{-5}. The maximum 1,1-DCA concentration is 2.8 percent of the GW RAO.

Figure 5.1 and **Figure 5.2** depict routine groundwater quality monitoring results for monitoring wells with detectable concentrations of 1-DCA for the S14 and S15 events.

Table 4 – S14 and S15 1,1-DCA Detections

Well	Number of Detections/Number of Samples	Range of 1,1-DCA Concentrations
WT101A	2/2	0.86 J – 5.7
WT101D	2/2	2.6 – 3.4
WT101E	2/2	1.1 – 1.4
WT106A	2/2	0.57 J – 2.2
WT106B	2/2	0.60 J – 1.2
WT111A	2/2	3.7 – 6.8
WT114B	3/3	0.51 J – 0.87 J
WT114C	3/3	0.48 J – 0.53 J
WT115B	2/2	3.6 – 5.2 J
WT115C	2/2	1.9 – 2.6
WT116A	2/2	1.4 – 1.8
WT121A	2/2	0.87 J – 1.2
WT122A	1/2	0.41 J
WT122B	2/2	0.56 J – 0.66 J

Note:
All laboratory data is reported in micrograms per liter
J Estimated concentration

1,1-DCA was detected in groundwater samples collected during the reporting period from Upper and Intermediate Aquifer monitoring wells located along the southern Site boundary. 1,1-DCA was also detected in groundwater samples collected from Upper Aquifer monitoring wells WT106A and WT121A, located south and southeast of the Site. The detected concentrations were significantly less than the calculated Tapwater RSL of 240 μg/L.

1,1-DCA was also detected in groundwater samples from Intermediate Aquifer monitoring wells WT114B and WT114C, located east of the Site, at significantly less than the calculated Tapwater RSL. 1,1-DCA was not detected in groundwater samples collected from Intermediate Aquifer monitoring wells WT120A and WT120B, which are located further east and delineate the eastern limit of 1,1-DCA in the Intermediate Aquifer.

1,1-DCA was not detected (RDL=1.0 μg/L) in groundwater samples collected from any of the Lower Aquifer monitoring wells during this reporting period.

Consistent with previous 1,1-DCA monitoring data and reports, the pattern of widespread, low-concentration 1,1-DCA detections is not consistent with a distinct, high-concentration VOC source. The distribution of 1,1-DCA in groundwater at the Site is more consistent with residual contamination undergoing degradation in the absence of ongoing contaminant loading.

2.3.5 cis-1,2-Dichloroethene (cis-1,2-DCE)

cis-1,2-DCE was detected in 20 of 58 routine groundwater samples collected during this reporting period, or 34.5 percent of the samples (Table 4.2). The range of detected concentrations was from 0.20 J μg/L to 2.7 μg/L. Concentrations of cis-1,2-DCE in all groundwater samples did not exceed the Primary MCL of 70 μg/L for cis-1,2-DCE. The maximum cis-1,2-DCE concentration of 2.7 μg/L is 3.8 percent of the GW RAO.

Figure 5.1 and **Figure 5.2** depict routine groundwater quality monitoring results for monitoring wells with detectable concentrations of cis-1,2-DCE for the S14 and S15 events.

The distribution of cis-1,2-DCE is similar to the distribution of 1,1-DCA. cis-1,2-DCE was detected in groundwater samples from the following eleven monitoring wells:

Table 5 – S14 and S15 cis-1,2-DCE Detections

Well	Number of Detections/Number of Samples	Range of cis-1,2-DCE Concentrations
WT101A	1/2	0.81 J
WT101D	2/2	0.50 J - 0.60 J
WT101E	2/2	0.22 J - 0.24 J
WT106A	1/2	0.39 J
WT114B	3/3	0.20 J - 0.32 J
WT115A	1/2	0.66 J
WT115B	2/2	1.7 J – 1.7
WT115C	2/2	0.45 J - 0.48 J
WT116A	2/2	1.3 – 2.7
WT121A	2/2	1.1 - 1.3
WT122A	2/2	0.71 J – 0.74 J

Notes:
All laboratory data is reported in micrograms per liter
J Estimated concentration

As shown on **Figure 5.1** and **Figure 5.2**, cis-1,2-DCE was detected in groundwater samples collected from the Upper and Intermediate Aquifer monitoring wells located along the southern Site boundary. cis-1,2-DCE was detected in the groundwater samples collected from WT106A and WT121A, located southeast of the Site, at a maximum concentrations of 1.3 μg/L.

cis-1,2-DCE was also detected east of the Site in groundwater samples collected from Intermediate Aquifer monitoring well WT114B, but not in samples from Intermediate Aquifer monitoring wells WT120A and WT120B, located further east of the Site.

cis-1,2-DCE was not detected (RDL=1.0 μg/L) in groundwater samples collected from Lower Aquifer monitoring wells.

The distribution of cis-1,2-DCE in groundwater near the Site during the S14 and S15 monitoring events were similar to each other and consistent with baseline monitoring results. The spatial pattern of widespread, low-concentration cis-1,2-DCE detections and the stable distribution of

VOCs over time is consistent with residual contamination undergoing degradation in the absence of ongoing contaminant loading.

2.3.6 Vinyl Chloride

Vinyl chloride was detected in seven of 58 groundwater samples collected from the monitoring well network during this reporting period, or 12.1 percent of the samples (**Table 4.2**). Vinyl chloride concentration detections in groundwater samples ranged from 0.30 J µg/L to 0.98 J µg/L, as follows:

Figure 5.1 and **Figure 5.2** depict routine groundwater quality monitoring results for monitoring wells with detectable concentrations of vinyl chloride for the S14 and S15 events.

Table 6 – S14 and S15 Vinyl Chloride Detections

Well	Number of Detections/Number of Samples	Range of Vinyl Chloride Concentrations
WT106B	2/2	0.80 J – 1.1
WT116A	2/2	0.30 J – 0.98 J
WT121B	2/2	0.61 J – 0.83 J
WT122A	1/2	0.43 J

Note:
All laboratory data is reported in micrograms per liter
J Estimated concentration

Figures 5.1 and **5.2** depict vinyl chloride results for the Upper and Intermediate Aquifer for S14 and S15. Vinyl chloride was present in groundwater samples collected from the monitoring wells south of the Site, but at concentrations less than the GW RAO.

The concentrations of vinyl chloride detected in Lower Aquifer groundwater samples were less than the RDL of 1 µg/L and the MCL of 2 µg/L.

Vinyl chloride is produced in reducing environments by the degradation of chlorinated organic compounds such as trichloroethylene. The distribution of vinyl chloride in groundwater in the vicinity of the Site during the S14 and S15 monitoring rounds is consistent with the baseline monitoring results. The relatively low-level, stable vinyl chloride concentrations are consistent with residual contamination undergoing degradation in the absence of an ongoing source of VOC contaminants.

2.4 Metals and General Chemistry Analytes

2.4.1 Introduction

A total of 58 groundwater samples were collected from 27 monitoring wells during S14 and S15 for select metals and general chemistry analyses. **Tables 4.3**, **4.4**, and **4.5** summarize the metals and general chemistry results for the groundwater samples collected from the Upper,

Intermediate, and Lower Aquifers, respectively, during the reporting period. The laboratory analytical results for select metals and general chemistry are summarized in **Table 1.2**, **Table 1.3** and **Table 1.4**.

GES collected groundwater samples from monitoring wells WT102A, WT102B, and WT102C for metals and general chemistry parameters. These wells are located approximately 1,260 feet north of and upgradient of the Site. The 2012 Himco Annual Groundwater Monitoring Report (CRA, 2012) included a statistical analysis of data from these wells to determine background concentrations to compare with concentrations measured at other locations at the Site. Tables 1.2 through 1.4 provide the background concentrations for the metals parameters for the Upper, Intermediate and Lower Aquifers, respectively. Several of the background threshold values (BVs) exceeded their respective Primary MCL, Secondary MCL or Recommended Dietary Allowance (RDA).

The CD states that the GW RAOs are to prevent the use of groundwater that contains Site-related carcinogens and non-carcinogens in excess of MCLs. The CD also states that the GW RAOs are:

> *To prevent the use of groundwater which contains site-related sodium, calcium, and iron in excess of their upper intake limit or recommended dietary allowances for sensitive populations.*

However, nearby affected properties - in accordance with Environmental Restrictive Covenants (ERC) and Deed Notices (DN) - are prohibited from installing and utilizing groundwater wells; their private wells were abandoned in conjunction with connection to municipal drinking water.

There are no Primary MCLs for sodium, calcium, iron and manganese. There are Secondary MCLs for sodium (250 milligrams per liter [mg/L]) and iron (0.3 mg/L), but these are aesthetic criteria and are not health based. There is a health-based Tapwater RSL for iron of 26 mg/L. The RDA for calcium is 250 mg/L. In order to establish appropriate GW RAOs, GHD ranked these criteria as follows:

1. Primary MCLs
2. Tapwater RSL
3. RDA
4. Secondary MCLs

For example, there is no Primary MCL for iron, so the next level of criteria is the health based RSL Tapwater of 26 mg/L. There is no Primary MCL, Tapwater RSL or RDA for chloride. Therefore, the best available criterion for chloride is the Secondary MCL of 250 mg/L.

The following are the exceedances of the metals and general chemistry GW RAOs in each of the aquifer units:

Table 7 – Number of Exceedances of GW RAOs/Number of Samples (Metals and General Chemistry)

Parameter	Upper Aquifer	Intermediate Aquifer	Lower Aquifer
Arsenic	1/26	5/26	2/6
Calcium	4/26	0/26	0/6
Iron	2/26	0/26	0/6
Lead	1/26	0/26	0/6
Manganese	6/26	0/26	0/6
Sodium	2/26	0/26	0/6
Chloride	2/26	0/26	0/6
Sulfate	0/26	0/26	0/6

GES selected arsenic, calcium, manganese, sodium, and chloride for discussion purposes as these analytes are of concern to the USEPA and IDEM and have shown historical concentrations greater than their respective GW RAOs.

2.4.2 Arsenic

Arsenic was detected in 46 of the 58 routine groundwater quality monitoring samples collected during the reporting period. Arsenic concentrations ranged from 0.80 J µg/L to 20 µg/L. The GW RAO for arsenic is 10 µg/L, which is equal to its Primary MCL. Arsenic is the only metal parameter detected during the S14 and S15 monitoring rounds at concentrations greater than a GW RAO that is based on a Primary MCL.

Arsenic concentrations in groundwater samples collected from Upper Aquifer monitoring wells during S14 and S15 monitoring rounds were less than its GW RAO of 10 µg/L.

Figure 5.3 and **Figure 5.4** show the arsenic concentrations in groundwater samples collected from the monitoring wells from each aquifer. The concentrations of arsenic exceeded the GW RAO in S14 and S15 samples from the following Intermediate Aquifer monitoring wells:

Table 8 – S14 and S15 Arsenic Concentrations

Well	Date	Arsenic Concentration
WT106B	10/23/2018	10
WT114C	10/24/2018	20
WT114C	4/23/2019	14
WT121A	4/23/2019	14
WT121B	10/24/2018	14
WT121B	4/23/2019	12

Note:
All laboratory data is reported in micrograms per liter

Intermediate Aquifer monitoring well WT114C is located immediately east of the Site and WT121B is located southeast of the Site and east of WT106B. The S14 and S15 arsenic results for these wells are consistent with previous results.

Figure 5.3 and **Figure 5.4** shows the arsenic concentrations in groundwater samples collected from monitoring wells during S14 and S15. The arsenic concentrations in groundwater samples collected from WT106C during this reporting period were 13 μg/L and 12 μg/L in the October 2018 and April 2019 groundwater samples, respectively, which is greater than the GW RAO of 10 μg/L. These are consistent with previous results.

2.4.3 Calcium

Calcium was detected in all of the 58 routine groundwater quality monitoring samples collected during this reporting period. Calcium concentrations in groundwater samples ranged from 46,000 μg/L to 480,000 μg/L. The GW RAO for calcium is 250,000 μg/L, and is equal to its RDA.

Figure 5.3 and **Figure 5.4** show the calcium concentrations in groundwater samples collected from the monitoring wells from each aquifer. There is a plume of calcium in the Upper Aquifer defined by the GW RAO (250,000 μg/L). Calcium concentrations in the Upper Aquifer greater than the GW RAO were detected in groundwater samples collected from the following monitoring wells:

Table 9 – S14 and S15 Calcium Concentrations

Well	Date	Calcium Concentration
WT115B	10/23/2018	290,000
WT115B	4/24/2019	290,000
WT116A	10/25/2018	480,000
WT116A	4/24/2019	480,000

Note:
All laboratory data is reported in micrograms per liter

The maximum calcium concentrations in the Upper Aquifer were detected in groundwater samples collected from monitoring well WT116A, located within the limit of the waste in the south-central portion of the Site. Calcium concentrations have also typically exceeded the GW RAO in groundwater samples collected from monitoring well WT115B, located in the southeast portion of the Site and within the limits of waste.

Calcium concentrations in the Intermediate and Lower Aquifers were less than the GW RAO.

The calcium concentrations in groundwater samples collected at the Site are generally stable and only exceed the GW RAO in the Upper Aquifer in the immediate vicinity of the former landfill area. The calcium data for the S14 and S15 routine groundwater quality monitoring rounds are generally consistent with the baseline groundwater monitoring results from September 2011 and other routine monitoring data.

2.4.4 Manganese

Manganese was detected in 52 of the 58 routine groundwater quality monitoring samples collected during the reporting period. The concentrations of manganese in groundwater samples ranged from 4.9 µg/L to 2,700 µg/L. The GW RAOs for manganese in the Upper and Lower Aquifers are 1,070 µg/L and 1,140 µg/L, respectively, which are the respective BVs for those aquifers. The GW RAO for manganese in the Intermediate Aquifer is 880 µg/L, which is its Secondary MCL.

Figure 5.3 and **Figure 5.4** show the manganese concentrations in groundwater samples collected from the monitoring wells from each aquifer. The samples that contained manganese at concentrations that were greater than the GW RAO were as follows (all in the Upper Aquifer):

Table 10 – S14 and S15 Manganese Concentrations

Well	Date	Manganese Concentration
WT101A	10/24/2018	1,300
WT101A	4/24/2019	1,100
WT106A	4/23/2019	2,000
WT114A	10/24/2018	1,500
WT116A	10/25/2018	2,200
WT116A	4/24/2019	2,700

Note:
All laboratory data is reported in micrograms per liter

WT101A and WT116A are located along the southern limit of waste.

The maximum manganese concentrations in the Intermediate and Lower Aquifer groundwater samples were 180 µg/L and 29 µg/L, respectively, which are less than the GW RAO.

The manganese data for the S14 and S15 routine groundwater quality monitoring rounds are generally consistent with previous monitoring rounds including baseline groundwater monitoring results from September 2011.

2.4.5 Sodium and Chloride

Sodium was detected in all of the 58 of the routine groundwater quality monitoring samples collected during the reporting period. Sodium concentrations in groundwater samples ranged from 480 µg/L to 270,000 µg/L. The GW RAO for sodium is 150,000 µg/L, which is its RDA.

Chloride was detected in 56 of the 58 groundwater samples collected from the monitoring well network during this reporting period. The detected concentrations of chloride ranged from 1.3 mg/L to 410 mg/L. The GW RAO for chloride is 250 mg/L, which is equal to its Secondary MCL.

Figure 5.3 and **Figure 5.4** show the sodium and chloride concentrations in groundwater samples collected from the monitoring wells from each aquifer. The sodium concentration in the

groundwater samples collected from WT114A in October 2015 and April 2017 were greater than the GW RAOs. The concentration of chloride was greater than the GW RAO in the October 2018 and the April 2019 groundwater samples from WT114A. The exceedance of chloride is typical for monitoring well WT114A. All other sodium and chloride concentrations in Upper Aquifer groundwater samples were less than the GW RAOs. Monitoring well WT114A is cross gradient of the Site and is located adjacent to the John Weaver Parkway. The source of the sodium and chloride in the groundwater samples collected from WT114A is potentially due to road salt applied to the adjacent roadway.

Sodium and chloride concentrations in the S14 and S15 groundwater samples from the Intermediate and Lower Aquifers were less than the GW RAO.

The sodium and chloride results for the routine groundwater quality monitoring samples for this monitoring period are consistent with historic baseline groundwater monitoring results.

3 Recent Reports and Site Controls

Two recent reports (since the most recent AGMR submission) address various protective site controls and risk-mitigation activities recently undertaken at the Site. They have been approved by USEPA and IDEM; an executive summary of each report and the issues to which they address are described below.

3.1 Private Well Sampling Report (October 2018):

As documented in previous AGMR's, an arsenic plume is present in the Intermediate Aquifer and groundwater has been consistently confirmed flowing to the south. Samples from several groundwater monitoring wells routinely contain arsenic at concentrations greater than the GW RAO of 10 µg/L. While arsenic was not placed in the landfill, it does naturally occur in the soil. As the landfill uses up oxygen in the groundwater, it creates favorable reducing conditions for the arsenic, thus making it present in the groundwater in variable concentrations at select locations. Previous detailed groundwater analyses concluded that arsenic concentrations in the groundwater have been stable without increasing and do not pose a human health risk in these groundwater monitoring wells.

The Private Well Sampling Report (October 2018), detailed the historical and recent sampling events of nearby private wells. In September 2015, the Trust canvassed residences and businesses in the vicinity of the Intermediate Aquifer to determine the source of drinking water at the properties (e.g., municipal water or private well) and to determine if there was a potential for the private wells to intercept the Intermediate Aquifer arsenic plume. During the 2015 visit, 23 properties were documented: private wells were confirmed on 12, municipal water was supplied to 7, and 4 unoccupied properties prevented official documentation of water supply. These properties represented the entire potential scope as previous review of water main records/maps indicated that municipal water supplies were already available and present south of Bristol Street, further southeast of the property.

Following a combined agency site-walk in October 2017 (USEPA, IDEM, and the United States Army Corps of Engineers [USACE]), the Trust – in an effort to investigate, determine, and mitigate potential arsenic impacts – recommended that in lieu of installation of additional monitoring wells, a risk-based approach would be implemented by finalizing the door-to-door survey and sampling any remaining private wells.

With agency confirmation, the Trust conducted the final door-to-door survey to confirm the current private wells status for all properties. In July 2018, all properties were confirmed to either have eliminated private wells and/or maintain connection to the municipal water supply; there were 11 final/remaining properties confirmed to have private water supplies. Following receipt of owners' consent, sampling efforts commenced at these properties.

The 2018 private well results were all less than the arsenic GW RAO, with the exception of the sample collected from 1241 North Nappanee Street. This property is currently an auto sales lot consisting of a large parking lot, a sales trailer, and a connected garage and storage building, which contains a bathroom supplied by a private well (used for handwashing/sewage; bottled water is used for human consumption). In an effort to eliminate any risk from consumption, the Trust coordinated with the property owner and funded the connection of the property to the available public water supply and abandoned the well in compliance with 312 Indiana Administrative Code (IAC) 13-10-2. The abandonment and connection to the municipal water supply were completed in May 2019.

Thus, there are no remaining potentially affected private wells which exceed the arsenic GW RAO.

3.2 Long-Term Stewardship Plan (April 2019):

The Institutional Controls Implementation and Assurance Plan (ICIAP) also known as the Long-Term Stewardship (LTS) Plan presents procedures to implement, maintain, and enforce institutional controls (ICs) at the Himco Site. It was originally submitted in December 2018 and finalized in April 2019, following conditional USEPA approval and requested modifications.

The LTS Plan outlines the various controls enacted at the Site and the surrounding vicinity. As documented in the LTS Plan, the remedy selected for the landfill and associated parcels surrounding the area entailed implementing ICs in the form of deed restrictions (or other appropriate institutional controls) which: prohibit both future groundwater use and future drilling or digging into the landfill cover; limit the land reuse to industrial, recreational, or commercial; require abandoning any private well; and require feasibility studies to determine appropriate redevelopment scenarios, subject to USEPA/IDEM approval.

These ICs have been instituted on all affected parcels (both the landfill and off-Site) in the form of ERCs and DNs.

> On-Site parcels: Land use restrictions are memorialized in ERCs signed by Bayer Healthcare LLC and Indiana Michigan Power filed with the Elkhart County Recorder. Four (4) landfill parcels (D, F, Q, and S) – for which a signed ERC was in place – were transferred in January 2018 to Cooper Land Company of New Jersey Inc., an affiliate of

Bayer HealthCare LLC. In 2018, Giada Holdings, LLC purchased Parcel J in a delinquent tax sale; this landfill parcel was formerly owned by Zap Distributing LLC and CLD Corporation. Since the former owners did not sign an ERC, a DN was placed on this parcel in April 2018. A recorded Temporary Access Agreement also places some additional controls on the property. CLD Corporation currently owns a thin 1.38 acre parcel (that bisects Parcel J) and this parcel is subject to an ERC. Additionally, the Elkhart County Private Well Ordinance No. 2017-24 applies to the landfill property and all surrounding parcels and places further restrictions on the installation of any groundwater wells.

Off-Site Parcels: the remaining off-Site parcels (south, east, and west of the site) all have ERCs, with the exception of four parcels, for which a DN is in place.

The following four (4) IC Instruments described below were selected as the mechanisms in which to assure compliance with the aforementioned remedies and ICs:

1. Annual Report: Per the Five Year Review (FYR), an Annual IC Monitoring, Compliance Assurance, and Certification Report (Annual Report) that will include a certification statement and results of IC reviews will be submitted to USEPA. It will demonstrate that the site was inspected to ensure no inconsistent uses have occurred, ICs remain in place and are effective, and any necessary contingency actions have been executed.
2. Quarterly Progress Reports: The Himco Trust will declare compliance with the ERCs in quarterly progress reports.
3. Well Verification: The Himco Trust will maintain compliance by verifying the absence of new groundwater drinking wells and changes in land use once during each FYR cycle and declare compliance in the Annual Report.
4. Land Restriction Verification: The Himco Trust will maintain compliance by verifying implemented land use restrictions via the Elkhart County Recorder's office (and current owners as needed) once during each FYR cycle and declare compliance in the Annual Report.

In summary, the Himco Trust has successfully completed all of the CD/ROD-required remedies at the site and implemented the prescriptive ICs. The remaining tasks currently ongoing at the Site include: soil gas monitoring, groundwater monitoring, inspections, routine reports, and IC implementation/assurance.

4 Statistical/Trend Analysis

4.1 Introduction and Background

The following provides a description of the purpose, USEPA/IDEM-approved methodology, results, and conclusions of GES' recent Statistical Analysis of Constituents of Concern of the current groundwater monitoring program for the subject facility.

In early 2019, USEPA, IDEM, and the PSDs agreed upon a focused scope for the statistical trend analysis which was limited to benzene, calcium, and manganese in the Upper Aquifer as well as arsenic in all aquifers. The other eight parameters depicted a long history (e.g., 14+ events) without any exceedances and/or results well under the applicable GW RAO; thus, they were not required or relevant for inclusion in the analysis.

Dissolved phase analytical results from September 2011 through April 2019 were evaluated by GES to:

- identify any potential outliers,
- identify the long term trend of analytical results,
- determine the 95% upper confidence limit (UCL), and
- compare the UCL to the prioritized regulatory limits (e.g., Primary MCL, Tapwater RSL, etc.), as previously described in section 2.4.1, for determining if current and future concentrations will remain in compliance.

Based on the current conceptual site model the shallow, intermediate and deep subsurface zones were evaluated using dissolved phase concentrations of benzene, arsenic, calcium, and manganese. Analysis was performed based on historical exceedances of these constituents, specific to each well. Therefore not all constituents were evaluated at each well or subsurface zone. **Appendix B** provides a summary of the statistical analyses performed at each well location. Details of the analysis are provided in the following sections.

In addition to the statistical/trend analysis, historical documents regarding arsenic were independently reviewed to confirm that arsenic at the Site is naturally occurring and not associated with the landfill waste. The results of the review are provided in Section 4.4.

4.2 Analysis Method

The statistical analysis was performed using the Monitoring and Remediation Optimization System (MAROS) software package developed by GSI Environmental, Inc. for the Air Force Center for Engineering and the Environment. The MAROS software provides a highly prescriptive process for analyzing groundwater constituent results.

The software was provided a historical dataset of analytical results for 27 well locations and a quantification of plume dimensions, seepage velocity, distance to receptors, and aquifer thickness. Qualitative descriptions of the monitoring wells in relation to the extent of constituents are also provided. Wells were classified as 1) within the source, 2) within the tail, or 3) as delineation wells. MAROS applies a series of statistical analyses to individual wells and constituents. These analyses include: Mann-Kendall trend, linear regression trend, Dixon Outlier test, determination of the 95% UCL and an evaluation of whether constituent concentration is suitably below regulatory limits to be considered “cleaned up”. This final evaluation uses the trend, distribution of observed concentrations, and the UCL, along with adjusted prioritized regulatory limits to determine compliance. MAROS can also determine a statistically suitable sampling frequency of well locations. This sampling frequency is determined based on the trend

of constituent, seepage velocity and distance from receptors to ensure adequate sampling resolution to identify changes in the trend or transport of the constituent. **Appendix B** provides a summary of the statistical analyses performed at each well location.

GES performed an additional analysis to verify the MAROS determination of trends for individual wells and constituents. The Groundwater Spatiotemporal Data Analysis Tool (GWSDAT) software package was developed by Shell to provide interpolated groundwater concentrations of specified chemicals of concern (COCs) over time. GWSDAT also provides trend charts that plot observed analytical concentrations and confidence intervals for the trend. **Appendix B also** includes the GWSDAT trend charts for each well and constituent evaluated.

Based on the sampling program, which regularly collected samples in the spring and fall, GES also tested for seasonally adjusted significant trends. The seasonal Mann-Kendall trend test was performed using the XLStat toolkit. The seasonal test used a 2-cycle season to evaluate whether, when accounting for the temporal bias of sample collection, a statistically significant trend was identified. That statistical significance was determined by evaluating the p-value of the trend, values less than 0.05 indicate a significant trend. **Appendix B** includes the summary of the seasonal p-values.

4.3 Results and Conclusions (Statistical/Trend Analysis)

GES completed the statistical analysis for the site using the MAROS, GWSDAT and XLStat software toolkits. The statistical analysis was performed on the 27 monitoring well network for up to four key COCs including benzene, arsenic, calcium, and manganese, depending on subsurface zone and historical exceedances. A total of 63 location-constituent pairs were analyzed.

Arsenic: The UCL for arsenic ranged from 0.0011 to 0.0195 mg/L. There were 7 data outliers within the arsenic data and trends were established for 21 of the 27 location-analyte pairs evaluated.

Benzene: The UCL for benzene ranged from 0.0005 to 0.0251 mg/L. There were 2 data outliers within the benzene data and trends were established for 4 of the 12 location-analyte pairs evaluated.

Calcium: The UCL for calcium ranged from 77.09 to 622.63 mg/L. There were no data outliers within the calcium data and trends were established for 10 of the 12 location-analyte pairs evaluated.

Manganese: The UCL for manganese ranged from 0.0074 to 2.3944 mg/L. There were 3 data outliers within the manganese data and trends were established for 9 of the 12 location-analyte pairs evaluated.

The statistical analysis determined 2 key parameters; the trend of analytical results and the 95% UCL for each constituent at the specified wells. These 2 key parameters are interpreted with additional indicators including the seasonal significance of the trend, the calculated half-life of the constituent and the distribution assumption of the analytical results. The 95% UCL could be

established for all wells and constituents with detections; for some, however the trend could not be established.

The wells and constituents analyzed had a UCL below the prioritized regulatory limit for all locations except as noted below in this section as **Table 11**. Additionally, if a trend could be identified, it was stable, probably decreasing, or decreasing for all well and constituents except those noted below in this section as **Table 11**.

Based on the analysis, some location and constituents have UCLs in exceedance of the prioritized regulatory limit and stable to increasing trends. These locations include:

Arsenic:

- WT106C – Arsenic UCL of 0.012 mg/L, increasing (I) trend with the most recent sample marginally above the prioritized regulatory limit of 0.01 mg/L
- WT121A – Arsenic UCL of 0.011 mg/L, stable (S) trend with the most recent sample marginally above the prioritized regulatory limit of 0.01 mg/L
- WT121B – Arsenic UCL of 0.013 mg/L, stable trend with the most recent sample marginally above the prioritized regulatory limit of 0.01 mg/L

Benzene:

- WT115A – Benzene UCL of 0.006 mg/L, no trend (NT) could be determined with the most recent three (3) samples below the prioritized regulatory limit of 0.005 mg/L.

Calcium: N/A

Manganese:

- WT106A – Manganese UCL of 1.218 mg/L, probably increasing (PI) trend with the most recent sample above the prioritized regulatory limit of 1.07 mg/L
- WT116A – Manganese UCL of 2.125 mg/L, increasing trend with the most recent sample above the prioritized regulatory limit of 1.07 mg/L

In addition, three well locations, described below, indicated a seasonally significant probably increasing (PI) or increasing (I) trend with UCLs currently below the prioritized regulatory limit. Based on these increasing trends the UCLs may potentially exceed the prioritized regulatory limit within 2.5 to more than 10 years from the most recent sampling event.

- WT101C – Arsenic UCL of 0.008 mg/L, seasonally significant increasing trend with the most recent sample below the prioritized regulatory limit of 0.01 mg/L, constituent half-life is longer than 5 years
- WT106A – Benzene UCL of 0.005 mg/L, seasonally significant increasing trend could be determined with the most recent sample below the prioritized regulatory limit of 0.005 mg/L, constituent half-life is longer than 5 years. Note that benzene has not been detected in this well since 2014.
- WT115C – Arsenic UCL of 0.002 mg/L, seasonally significant increasing trend with the

most recent sample below the prioritized regulatory limit of 0.01 mg/L, constituent half-life is longer than 5 years

In summary, all other locations and constituents (54 location-constituent pairs) reviewed during this analysis exhibited UCLs below the prioritized regulatory limit with stable to decreasing trends, or exhibited UCLs in exceedance of the prioritized regulatory limit with trends probably decreasing (PD) to decreasing (D) or no trend determined.

Table 11 below presents (in **bold values**) the subset of results that are indicative of UCLs in exceedance of the prioritized regulatory limit and/or increasing/probably increasing trends.

Table 11 – Summary of Key UCL and Trends

Well	Constituent (Regulatory Standard mg/L)	95%	Recent Sample Above Goal	Trends	Trend Seasonally Significant	Half-life (years)
WT101A	Manganese (1.07)	**2.394**	Yes	D	No	>5
WT101C	Arsenic (0.01)	0.0075	No	**I**	Yes	>5
WT106A	Benzene (0.005)	0.0005	No	**I**	Yes	>5
WT106A	Manganese (1.07)	**1.218**	Yes	**PI**	No	NA
WT106B	Arsenic (0.01)	**0.0125**	No	D	No	NA
WT106C	Arsenic (0.01)	**0.0123**	Yes	**I**	No	NA
WT114A	Manganese (1.07)	0.5973	No	**PI**	No	NA
WT114C	Arsenic (0.01)	**0.0195**	Yes	PD	No	NA
WT115A	Benzene (0.005)	**0.0062**	No	NT	No	NA
WT115B	Benzene (0.005)	**0.0251**	Yes	D	Yes	>5
WT115B	Calcium (250)	**372.4**	Yes	D	No	>5
WT115C	Arsenic (0.01)	0.0022	No	**I**	Yes	>5
WT116A	Calcium (250)	**622.6**	Yes	D	Yes	>5
WT116A	Manganese (1.07)	**2.125**	Yes	**I**	Yes	NA
WT121A	Arsenic (0.01)	**0.0107**	Yes	S	No	NA
WT121B	Arsenic (0.01)	**0.0133**	Yes	S	No	NA
WT122A	Calcium (250)	**261.4**	No	D	No	>5

Based on the results of the statistical analysis performed for 63 well-constituent pairs, GES has determined that the majority of well constituents of concern analyzed have UCLs below the regulatory standard and determined trends are stable to decreasing. A table providing a summary of the information found through the statistical evaluation is attached as **Table 5.0 (Summary of Statistical Analysis and Conclusions)**. As discussed below, wells impacted by arsenic may be in areas with background arsenic values in exceedance of the regulatory standards. Therefore, stable or increasing trends in these wells may indicate equilibration to background values. Of special note is the benzene UCL for WT106A; benzene has not been detected in this well since 2014 and therefore the UCL above regulatory standard is not considered significant.

GES recommends that a limited number of wells be monitored for specific constituents of concern until the UCL is below regulatory standards and\or the trend can be determined to be decreasing.

Based on the MAROS analysis a biennial (once every two years) sampling program would be sufficient to track the UCL and trend without significant risk of spikes or changes in concentration. These well constituent pairs are shown below in this section as **Table 12**.

Table 12 – Well Constituents Recommended for Continued Sampling

Monitoring Well	Constituent
WT106A	Manganese
WT106C	Arsenic
WT115B	Benzene
WT116A	Manganese

Arsenic:

Furthermore, an independent review of the historical arsenic data and landfill chemistry was conducted by GES. The *2012 Annual Groundwater Monitoring Report* completed by CRA (June 2013) was reviewed in light of recent analytical results and the statistical trend analysis that was completed in this report. The results of the review are summarized below.

The calcium - as a tracer for the landfill - shows that the plume from the landfill impacts the shallow and intermediate aquifers and there is no impact on the deep aquifer. Key points include:

1) In order to determine if the elevated arsenic is natural or a landfill release, a tracer compound from the landfill release was required. Calcium was chosen as the tracer for the landfill plume for the following reasons:
    i. It is a major component of the waste in the form of calcium sulfate.
    ii. It is not redox-sensitive, and when dissolved in groundwater, exists as Ca(II). Ca(II) is unaffected by redox conditions and mobility and solubility are consistent across all ORP values.
    iii. Any calcium above BV at the site indicates landfill impact. This means that Ca(II) will be positively correlated with other landfill release compounds and elements.
2) Sulfate was statistically correlated with calcium in the intermediate and shallow aquifers (95% confidence level). Calcium in the deep aquifer did not correlate with sulfate, indicating a different source for the naturally occurring calcium.
3) A second component, directly related to naturally occurring arsenic (AS(V)) was identified. As naturally occurring arsenic is usually found absorbed to naturally occurring solid iron oxides, dissolved iron was chosen as the component in the groundwater that would be the most highly correlated with any naturally occurring dissolved arsenic. Elevated iron in the groundwater (above BV) is due to naturally occurring oxides being dissolved into the aquifer during reductive decomposition of organic compounds.
4) If released from the landfill, arsenic will have a positive correlation with calcium. If released from naturally occurring oxides in the soil, arsenic will have a positive correlation with iron. If there is no correlation with either, then the arsenic is at the natural equilibrium in the groundwater, and is not being impacted by changing redox conditions.
    a. Arsenic in the deep aquifer is not correlated with iron or calcium; it is naturally occurring, and is near or at BV.
    b. Elevated (above BV) Arsenic on Site is statistically correlated (95 percent confidence) with iron in the intermediate and shallow aquifer – indicating that its source in the groundwater is the same as elevated iron; the change in redox

conditions caused by the reduction of organic material. The wells where there are recorded arsenic exceedances on Site are also the locations where there have been persistent detections of vinyl chloride and/or carbon disulfide. The positive correlation of arsenic to iron in these locations indicates a single source for both metals: naturally occurring arsenic and iron both being dissolved into the aquifer from the aquifer soil, and not a landfill release.

Thus, elevated arsenic (above BV) in the intermediate and shallow aquifers show no statistically significant correlation with calcium. The lack of correlation with calcium (the tracer for the landfill plume) further supports that the arsenic is not a landfill release.

As noted extensively above, arsenic exposure has been extensively mitigated. The overwhelming majority of arsenic results had UCLs below the limits and/or stable or decreasing trends, with the exception of one well location (WT106C) that the statistical analysis yielded a recommendation for continued sampling once every two years.

Benzene: The overwhelming majority of benzene results had UCLs below the limits and/or stable or decreasing trends, with the exception of three well locations (WT106A, WT115A, and WT115B). Based on specific circumstances of WT106A and WT115A noted above, only WT115B is recommended for continued sampling once every two years.

Calcium: Three wells (WT115B, WT116A, and WT122A) had UCLs above the limits with decreasing trends. All other well locations were absent of any UCLs above the limits and any increasing trends. Thus, no further sampling for calcium is recommended in any well location.

Manganese: The overwhelming majority of manganese results had UCLs below the limits and/or stable or decreasing trends, with the exception of two well locations (WT106A and WT116A) that the statistical analysis yielded a recommendation for continued sampling once every two years.

5 Conclusions and Recommendations

5.1 Groundwater Elevation Monitoring

Data collected during S14 and S15 indicate that groundwater in the Upper, Intermediate, and Lower Aquifers typically flows south, consistent with the regional groundwater flow direction and previous monitoring data.

5.2 Groundwater Quality Monitoring

5.2.1 VOCs

Benzene was the only VOC detected at concentrations greater than its Primary MCL during the reporting period. Benzene concentrations that were greater than the GW RAO were detected in groundwater samples collected from only the Upper Aquifer monitoring well WT115B, located in the southeast corner of the landfill. Benzene results for this monitoring period are consistent with

the historic benzene concentrations in groundwater samples collected from WT115B that range between 11 μg/L and 34 μg/L. These stable, low-level concentrations are consistent with a local source of benzene near WT115B and illustrate that the benzene plume within the Upper Aquifer does not extend off site. Benzene was not detected above the MCL in the samples collected from WT115A or WT115C. Monitoring well WT115C is screened in the Intermediate Aquifer and provides vertical delineation of the WT115 benzene plume.

1,1-DCA, cis-1,2-DCE, vinyl chloride, and carbon disulfide were detected in 12.1 percent to 50 percent of routine groundwater quality monitoring samples collected during the reporting period. Unlike the distinct benzene plume in the vicinity of WT115, these other VOCs were detected at concentrations that were significantly less than their respective GW RAOs. 1,1-DCA, cis-1,2-DCE, and vinyl chloride detections are clustered along the southern Site boundary. The broad distribution of low-level concentrations of degradation products and the lack of change in the distribution of VOCs over time is consistent with residual VOC groundwater contamination undergoing degradation.

Routine groundwater quality monitoring results for this reporting period (S14 and S15) are similar to each other, and consistent with baseline (September 2011) monitoring data for VOCs.

5.2.2 Metals and General Chemistry Parameters

Arsenic, calcium, iron, lead, manganese, sodium, and chloride are the only metals and general chemistry parameters detected in groundwater samples at concentrations that exceeded their GW RAOs during this reporting period.

The GW RAO for arsenic is 10 μg/L, which is equal to its Primary MCL. The concentrations of arsenic exceeded the GW RAO in five S14 and S15 samples from Intermediate Aquifer including monitoring well WT114C (located immediately east of the Site) and WT106B and WT121B (located southeast of the Site). This is consistent with previous results.

The arsenic concentrations in groundwater samples collected during this reporting period from Lower Aquifer monitoring well WT106C ranged from 12 to 13 μg/L, which is greater than the GW RAO of 10 μg/L. This is consistent with previous results.

There are detections of calcium in the Upper Aquifer defined by the GW RAO of 250,000 μg/L, which is its RDA. Calcium concentrations in the Upper Aquifer that were greater than the GW RAO were detected in groundwater samples collected from Upper Aquifer monitoring wells WT115B and WT116A (located along the southern limit of waste). Calcium concentrations in groundwater samples from the Intermediate and Lower Aquifers were less than their GW RAOs.

There are detections of iron in the Upper Aquifer defined by the GW RAO of 26,000 μg/L. Iron concentrations in the Upper Aquifer that were greater than the GW RAO were detected in groundwater samples collected from Upper Aquifer monitoring wells WT114A (located east of the Site) and WT122A (located south of the Site). Iron concentrations in groundwater samples from the Intermediate and Lower Aquifers were less than their GW RAOs.

There are detections of lead in the Upper Aquifer defined by the GW RAO of 15 μg/L. Lead concentrations in the Upper Aquifer that were greater than the GW RAO were detected in the groundwater sample collected from Upper Aquifer monitoring well WT121A (located southeast of the Site). Lead concentrations in all other groundwater samples and from the Intermediate and Lower Aquifers were less than their GW RAOs.

There is a plume of manganese in the Upper Aquifer defined by the 1,070 μg/L contour, which is its GW RAO derived from its BV. The manganese concentrations in groundwater samples collected from WT101A and WT116A, which are located along the southern limit of waste, were greater than the GW RAO. The maximum manganese concentrations in the Intermediate and Lower Aquifer well samples were 180 μg/L and 29 μg/L, respectively, which are less than the GW RAO. The GW RAOs for manganese are based on BVs, not health based criteria.

Sodium and chloride concentrations that were greater than the GW RAO were detected in groundwater samples from Upper Aquifer monitoring well WT114A. Monitoring well WT114A is cross gradient of the Site and located adjacent the John Weaver Parkway. The source of the sodium and chloride in the groundwater samples collected from WT114A are potentially linked to road salt applied to the adjacent roadway. Sodium and chloride are not Site-related COCs.

The metals and general chemistry data for S14 and S15 routine groundwater quality monitoring are consistent with baseline groundwater monitoring results from September 2011 and other previous monitoring data.

5.3 Statistical/Trend Analysis

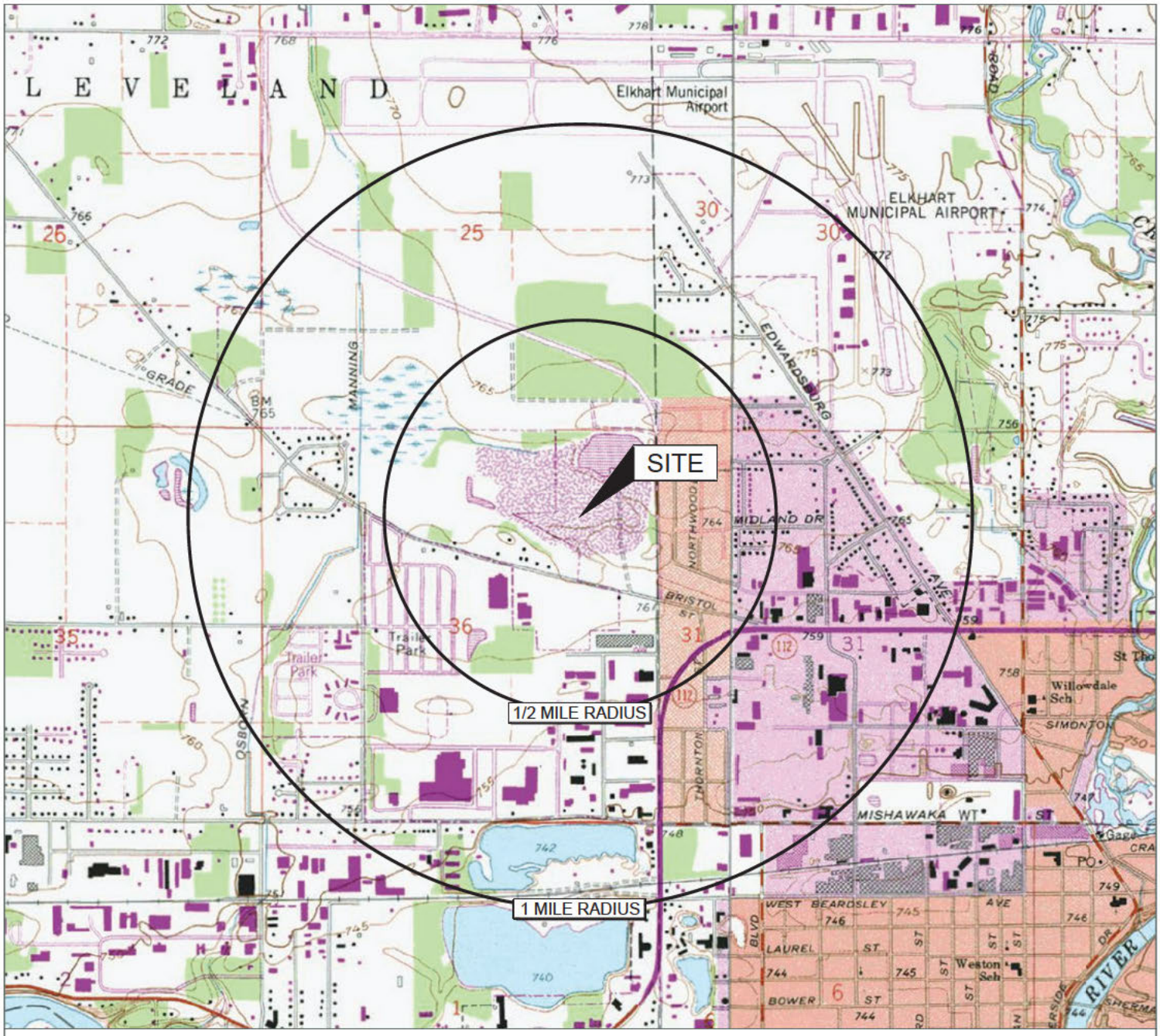
Based on the results of the statistical analysis performed for 63 well-constituent pairs, GES has determined that the majority of well constituents of concern analyzed have UCLs below the regulatory standard and determined trends are stable to decreasing. Based on site-specific information some wells may be in areas with background arsenic values in exceedance of the regulatory standards and therefore stable trends in these wells may indicate equilibrated background values. Of special note are the benzene UCL for WT106A and WT115A. Benzene has not been detected in well WT106A since 2014 and therefore the UCL above regulatory standard is not considered significant. The benzene for WT115A has been below regulatory criteria for the last 3 sampling events with only 38% of all sampling events having detections and therefore the UCL above regulatory standard is not considered significant. Based on these results, several monitoring wells could be removed from the monitoring program for the Site upon approval from USEPA/IDEM.

GES recommends that a limited number of wells (WT106A, WT106C, WT115B, and WT116A) be monitored for specific constituents of concern until the UCL is below regulatory standards and\or the trend can be determined to be decreasing. Based on the MAROS analysis a biennial (once every two years) sampling program for these select wells would be sufficient to track the UCL and trend without significant risk of spikes or changes in concentration. As an additional note, one of these wells identified to be monitored (WT106C) is based on an arsenic value that may be related to background concentrations.

5.4 Future Monitoring and Reporting

In concert with approval from USEPA/IDEM on October 31, 2019 and subsequent discussions, the groundwater monitoring activities will continue to include all wells and parameters and will be conducted on an annual basis in the future. The landfill inspection and soil gas monitoring efforts will also be conducted on an annual basis. The next occurrence for all Site events is tentatively scheduled for October 2020.

Figures



Source:
USGS 7.5 Minute Series
Topographic Quadrangle, 1994
Osceola, Indiana
Contour Interval = 5 feet
Township - 38 N
Range - 4 E
Section - 36

Quadrangle Location
LAT. 041 ° 42 ' 23.81 " N
LONG. 086 ° 00 ' 25.95 " W
(Approximate Site Coordinates)

Site Location Map

The HIMCO Site Trust
HIMCO Landfill
County Road 10
Elkhart, Indiana

Drawn W.A.W.
Designed
Approved
Date 08/13/19
Figure 1

N

Scale In Feet
0 2000

GES
Groundwater & Environmental Services, Inc.

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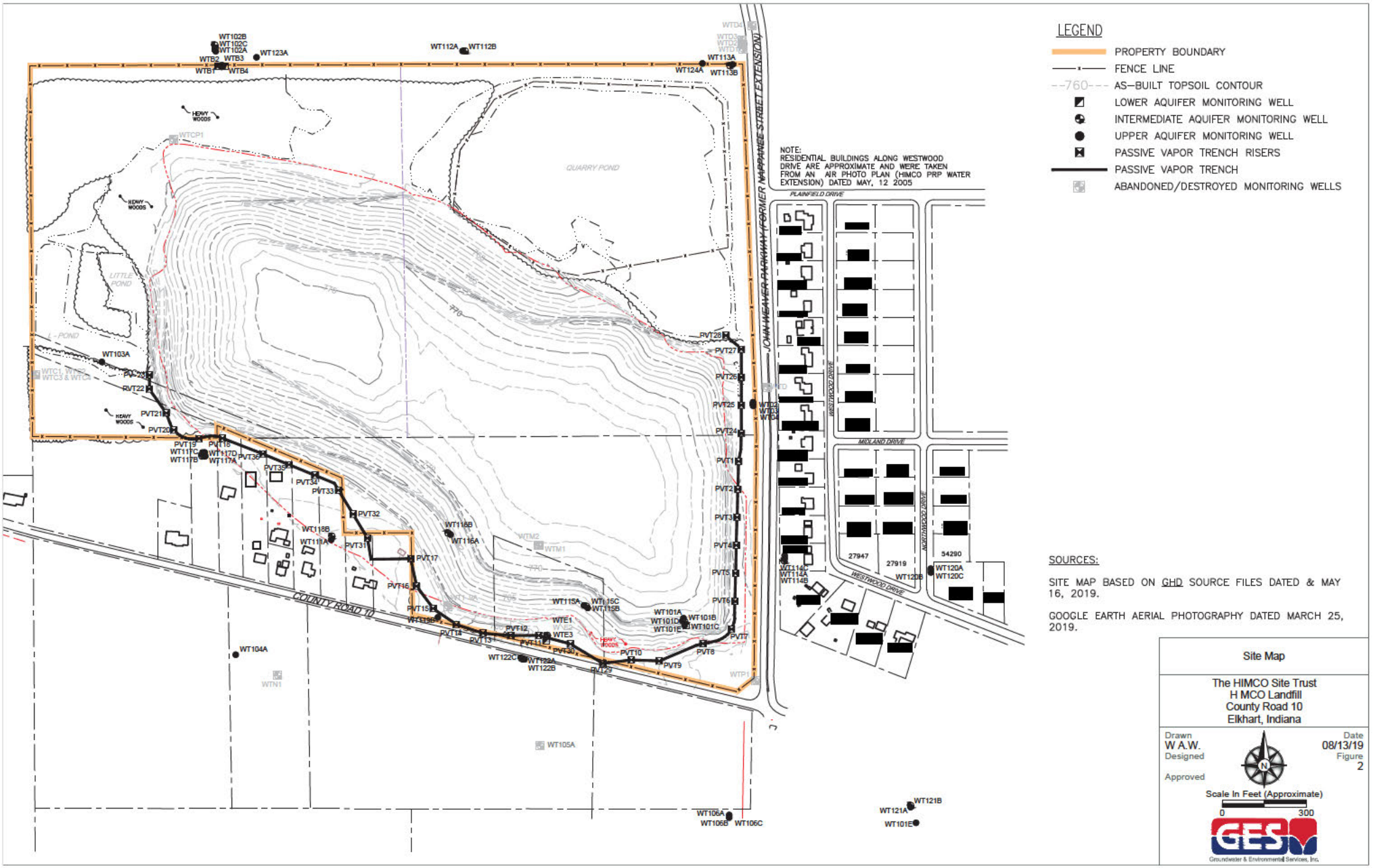

SOURCES:

SITE MAP BASED ON GHD SOURCE FILES DATED & MAY 16, 2019.

GOOGLE EARTH AERIAL PHOTOGRAPHY DATED MARCH 25, 2019.

Site Map

The HIMCO Site Trust
H MCO Landfill
County Road 10
Elkhart, Indiana

Drawn W.A.W.
Designed
Approved
Date 08/13/19
Figure 2

Scale In Feet (Approximate)
0 300

GES Groundwater & Environmental Services, Inc.

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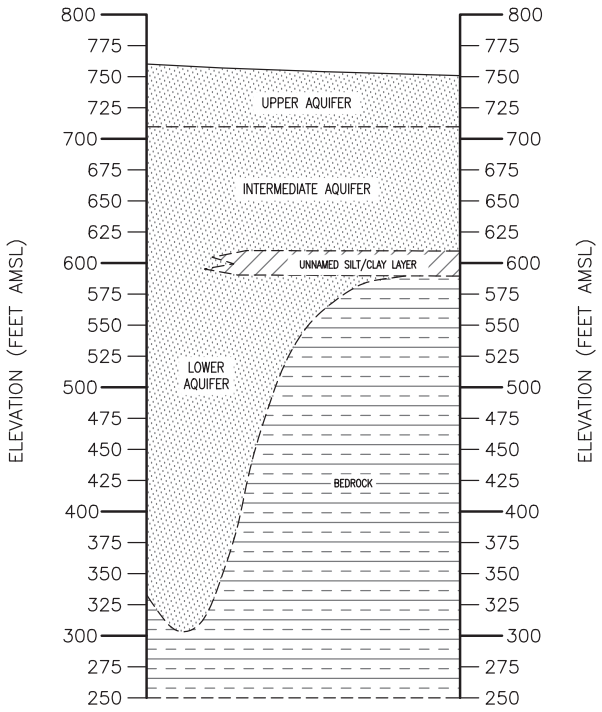

LEGEND

INFERRED LITHOLOGIC INTERFACE

AMSL ABOVE MEAN SEA LEVEL

SAND AND GRAVEL
DOTS 45°

SILTY, CLAY OR SILT/CLAY
ANSI31

SHALE
TRANS 90°

SOURCE:

SECTION BASED ON THE GSD FIGURE 3.1 DATED MAY 2, 2017 TITLED SCHEMATIC CROSS–SECTION HIMCO SITE, ELKHART INDIANA.

SCHEMATIC CROSS-SECTION

The HIMCO Site Trust
H MCO Landfill
County Road 10
Elkhart, Indiana

Drawn W A.W.
Designed
Approved
Date 09/10/19
Figure 3

Scale In Feet (Approximate)
Vertical 1" = 100'

GES
Groundwater & Environmental Services, Inc.

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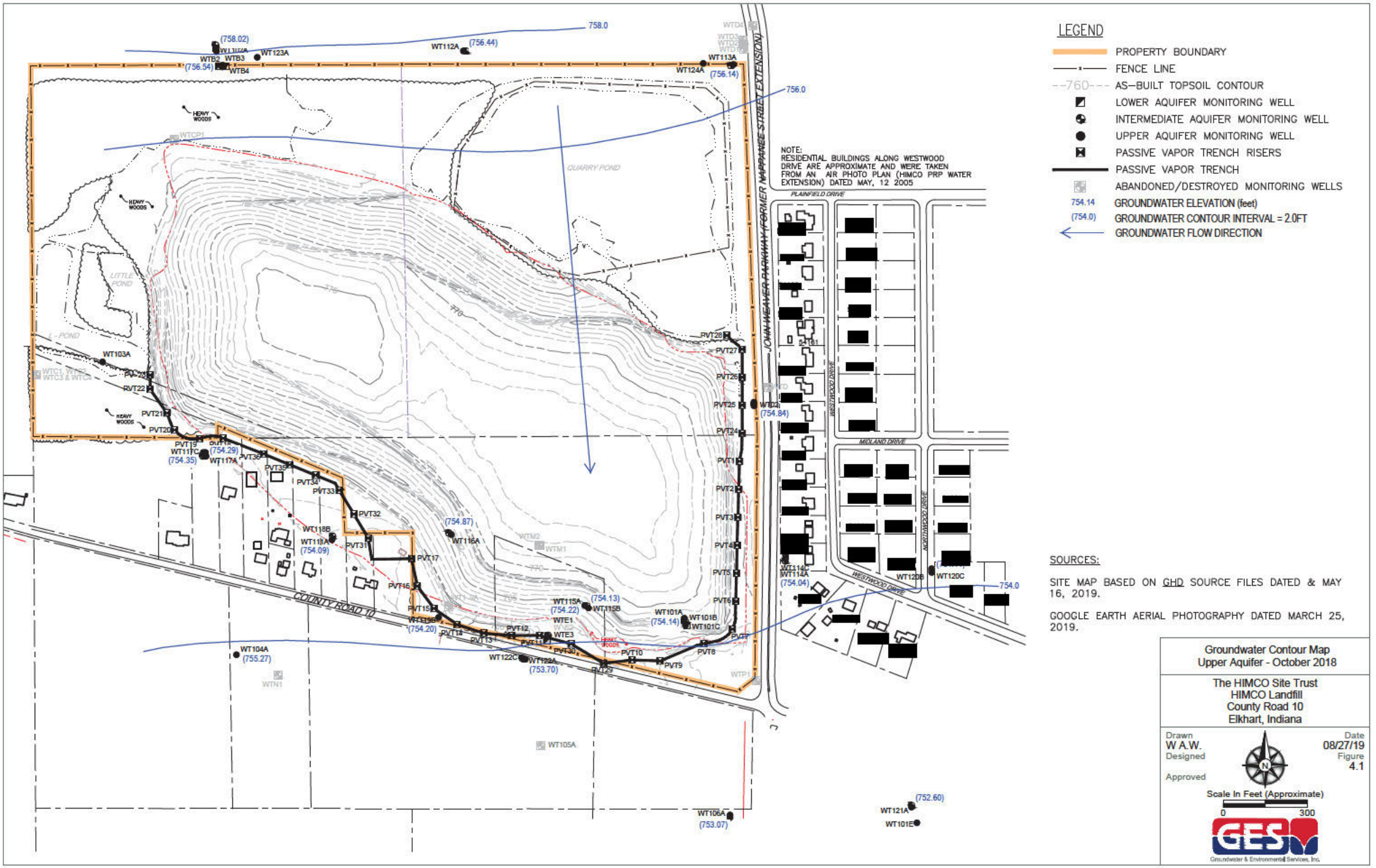

SOURCES:

SITE MAP BASED ON GHD SOURCE FILES DATED & MAY 16, 2019.

GOOGLE EARTH AERIAL PHOTOGRAPHY DATED MARCH 25, 2019.

Groundwater Contour Map
Upper Aquifer - October 2018

The HIMCO Site Trust
HIMCO Landfill
County Road 10
Elkhart, Indiana

Drawn W.A.W.
Designed
Approved
Date 08/27/19
Figure 4.1

Scale In Feet (Approximate)
0 300

GES Groundwater & Environmental Services, Inc.

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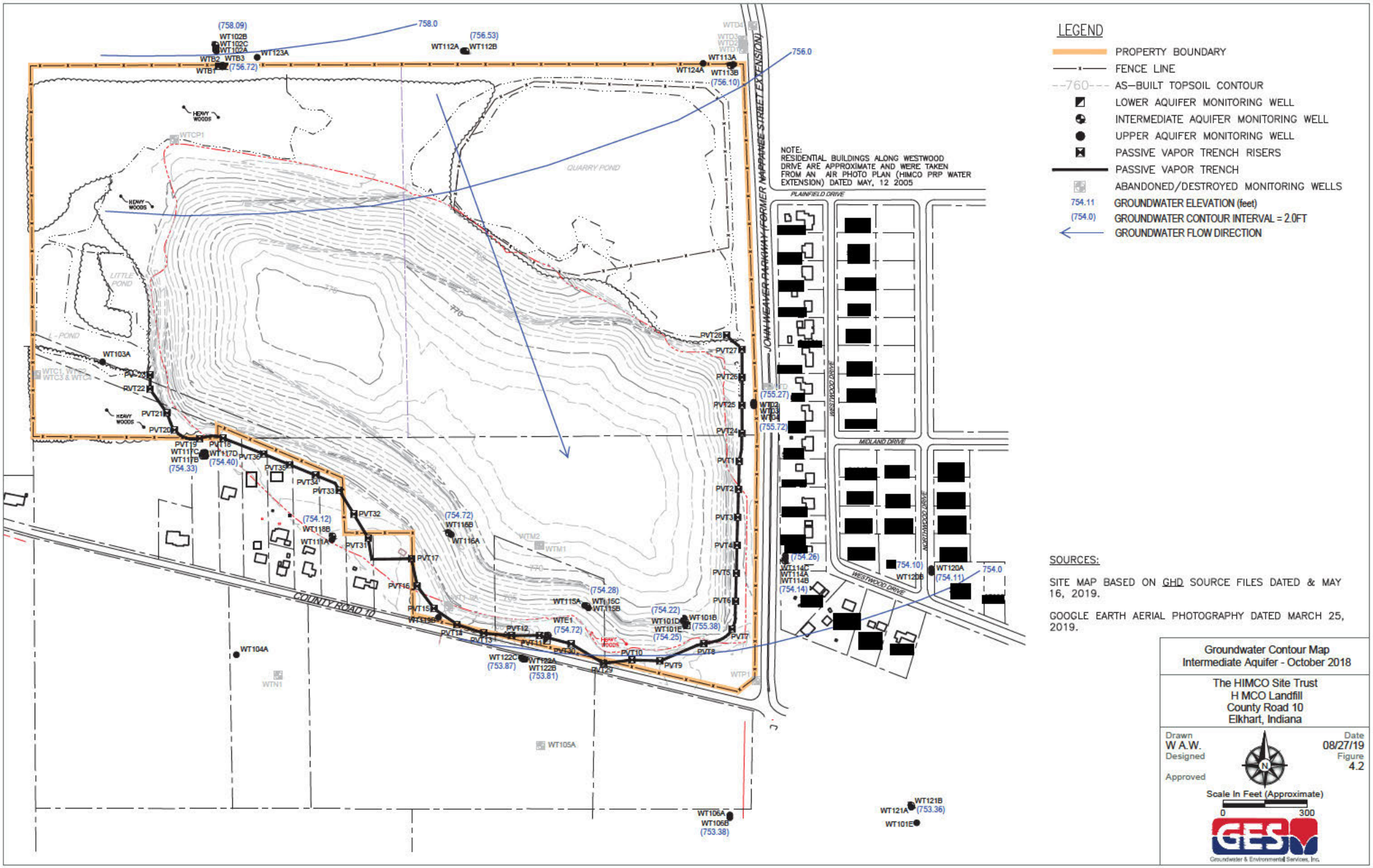

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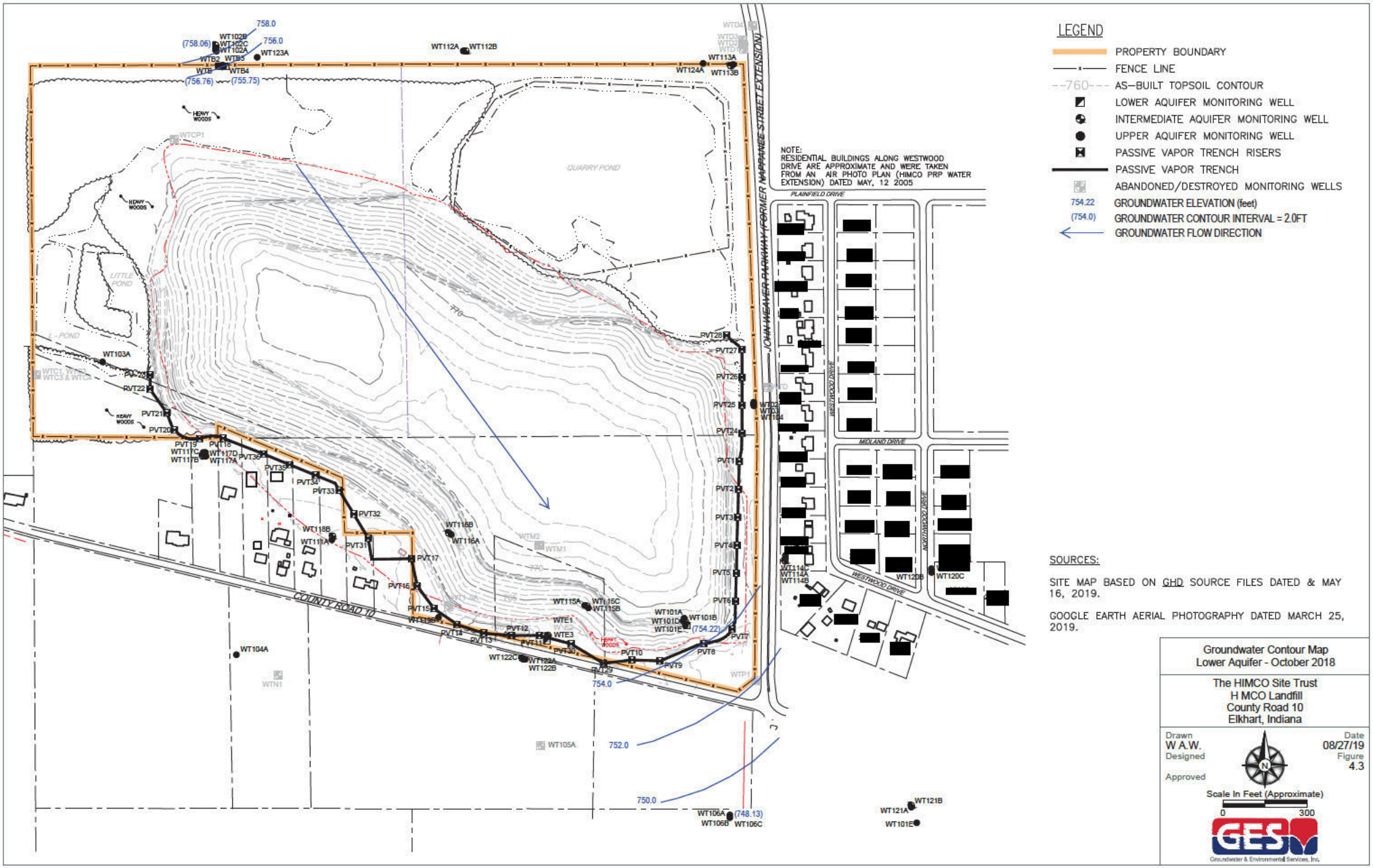

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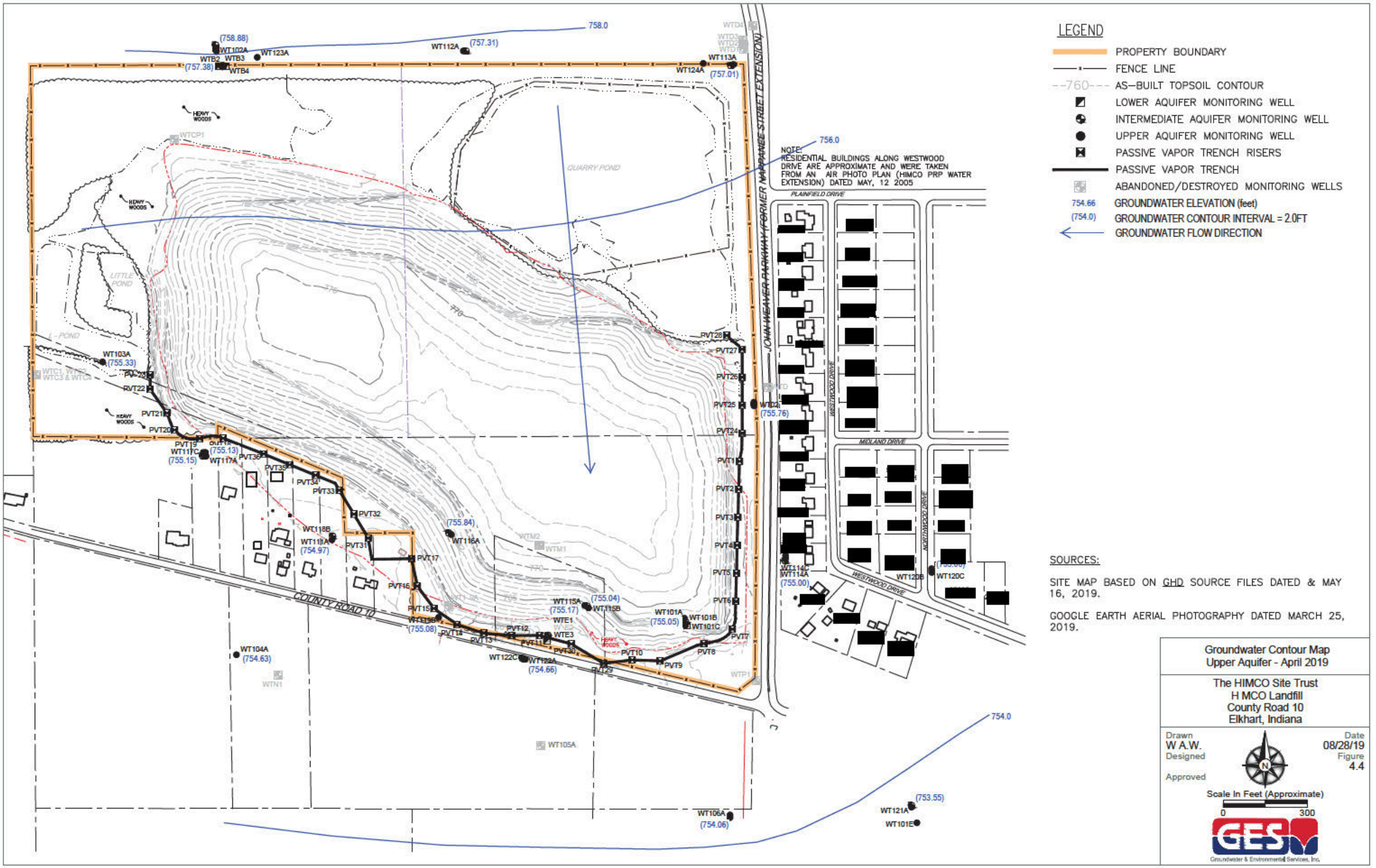

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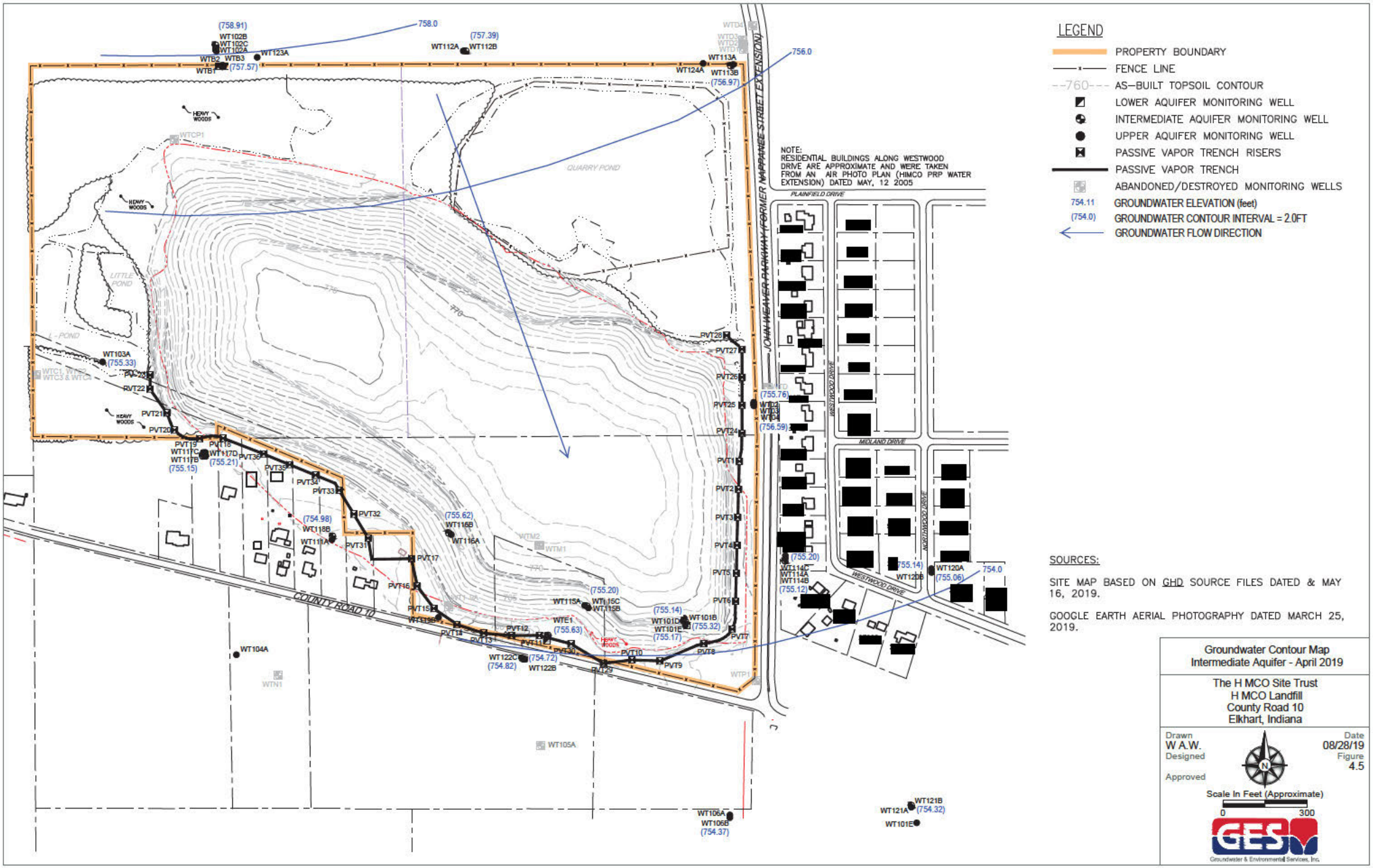

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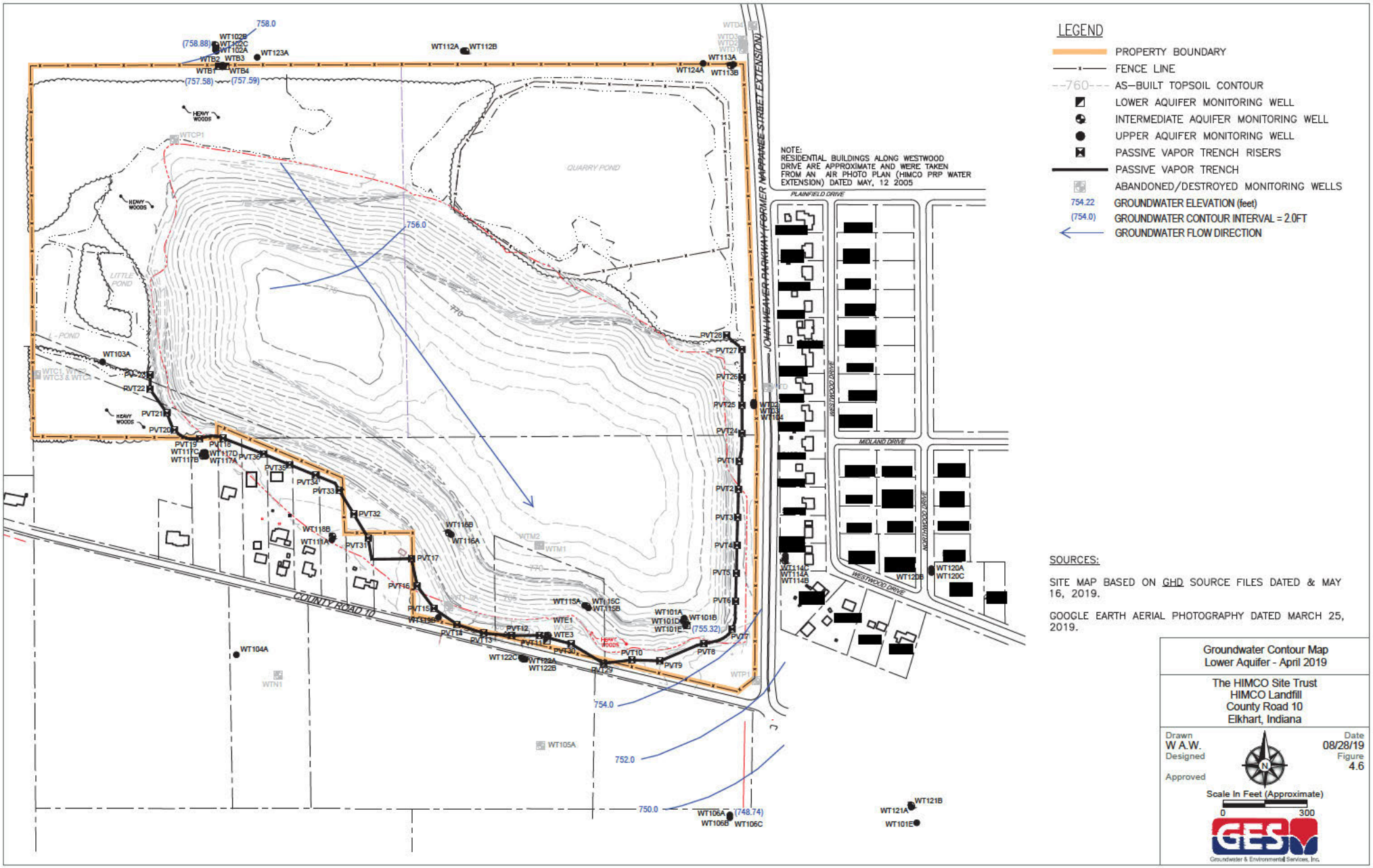

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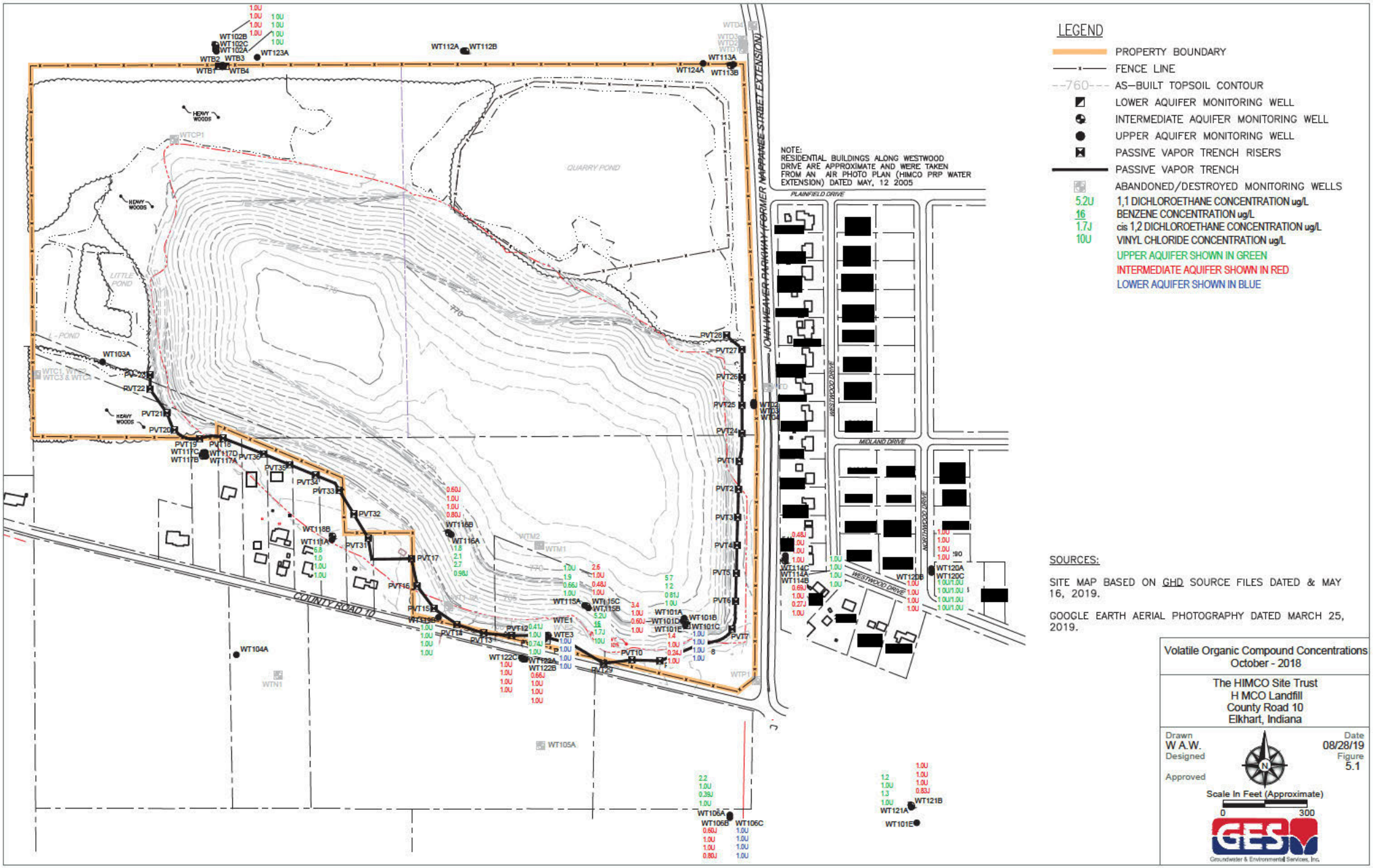

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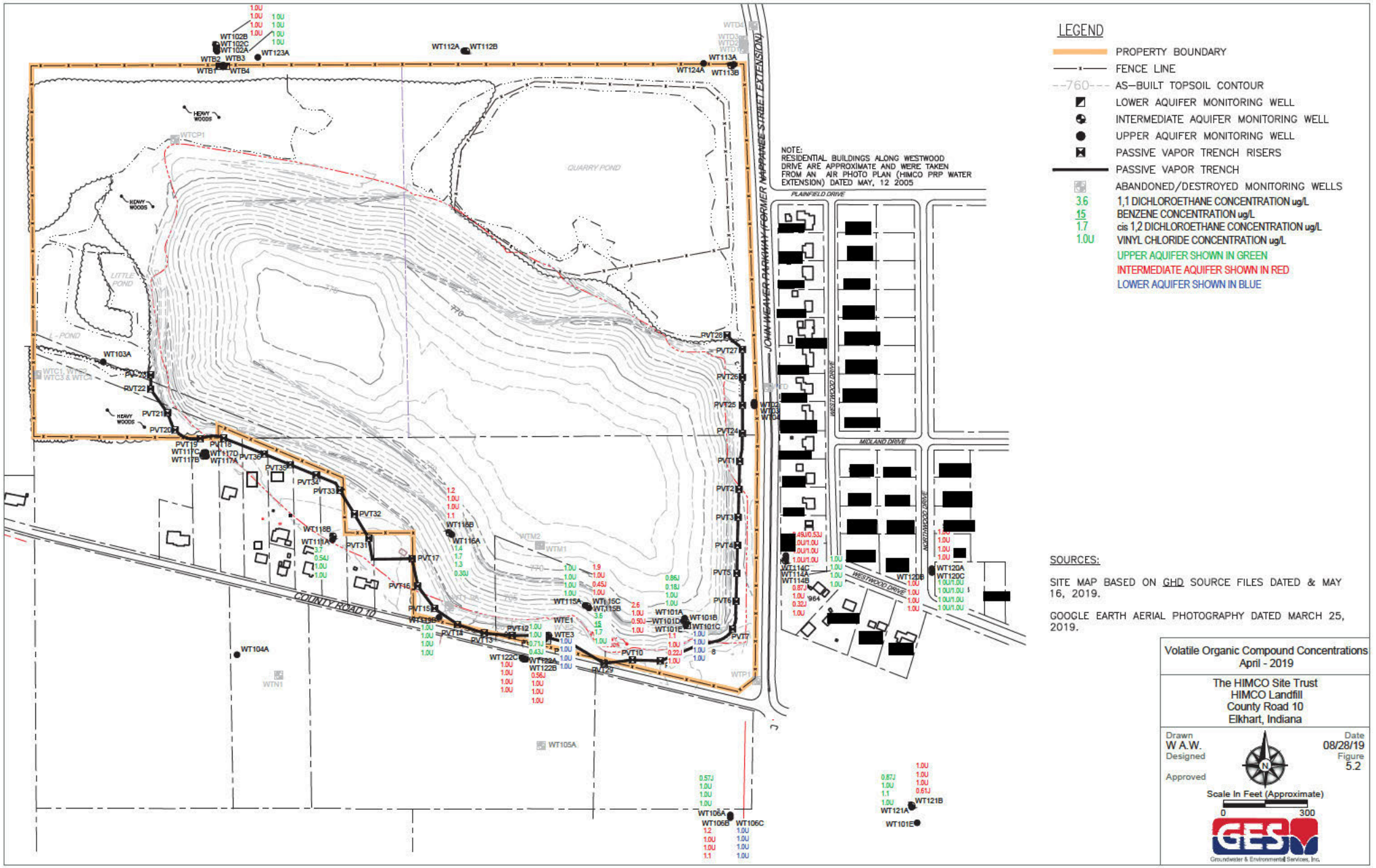

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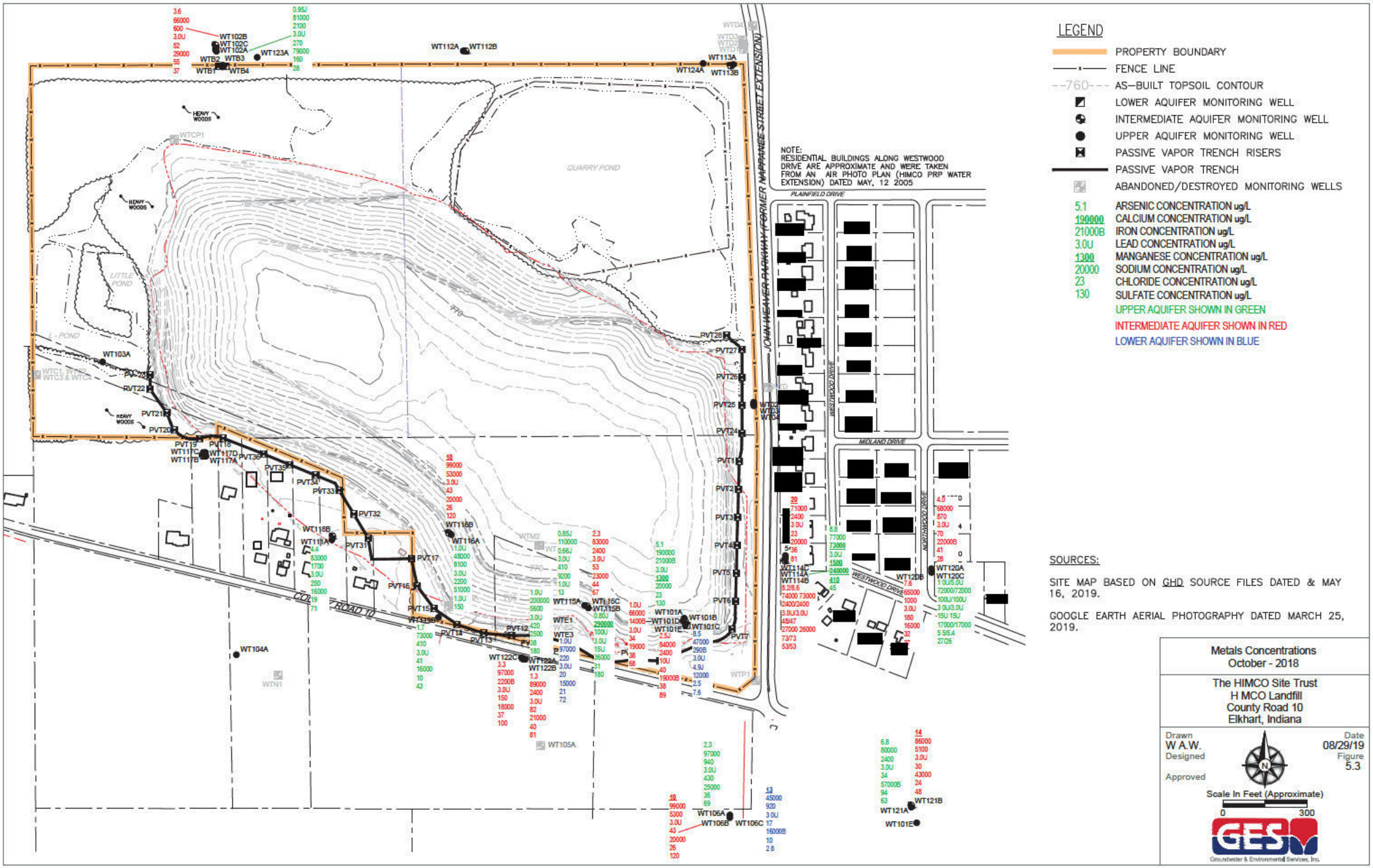

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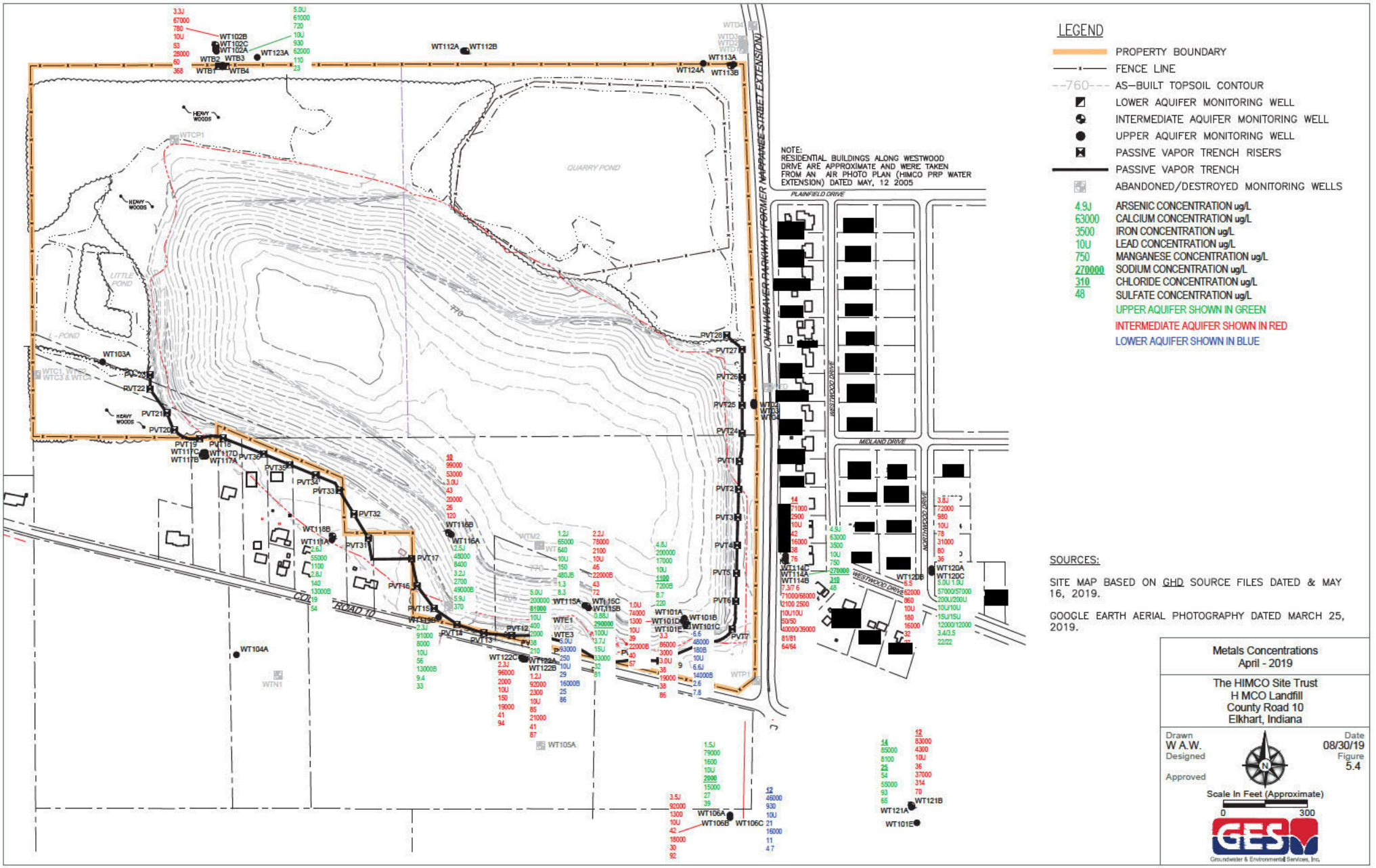

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Appendix J – USEPA Email Approval for Annual Sampling

From: DelRosario, Rosario (Ross) <delrosario.rosauro@epa.gov>
Sent: Thursday, October 31, 2019 10:47 AM
To: Matthew Myers <matthew.myers@bayer.com>
Cc: Petroff, Douglas (DPetroff@idem.IN.gov) <DPetroff@idem.IN.gov>
Subject: Himco 2019 Annual Groundwater Monitoring Report

Matt,

EPA, assisted by IDEM, provides comments below on the subject document. Please reference the contents of this email in your response.

Ross del Rosario
RPM

Comments on Himco 2019 Annual Groundwater Monitoring Report

1. The main body of the document, in the footnotes, is labeled as "Privileged and confidential information". EPA and IDEM have determined that this document, once finalized, is releasable to the general public, and, therefore, the designation that it's privileged and confidential is not justified and should be removed. Please revise the document accordingly;

2. Please include data validation reports and QA/QC data as part of the lab sample results, similar to prior submittals;

3. EPA and IDEM are agreeable to annual groundwater monitoring (starting in 2020), but retain the monitoring of all previously-sampled wells (27) and constituents of concern (12) for the time being. The agencies may reconsider the number of wells and constituents to be monitored in the future after reviewing the initial round of annual monitoring in 2020;

4. To ensure the site remains protective of human health and the environment as EPA moves forward on site delisting, the issuance of an ERC on Parcel J (Cory White's onsite property) plays an important role in achieving that goal. To the extent practicable, EPA requests that Bayer continue to engage the property owner (Cory White) on signing an ERC. The agencies encourages Bayer to use any acceptable incentives (e.g., cash, payment of property taxes, etc.) to achieve the goal of obtaining a signed ERC for said parcel; and

5. EPA and IDEM do not have comments on the statistical/trend analysis discussion found in Section 4 of the document. EPA does note that the analysis revealed increasing trends for arsenic, manganese, and benzene at certain wells in the network. This observation justifies the agencies' Comment #3 above relating to the proposed change to the ongoing groundwater monitoring program.